

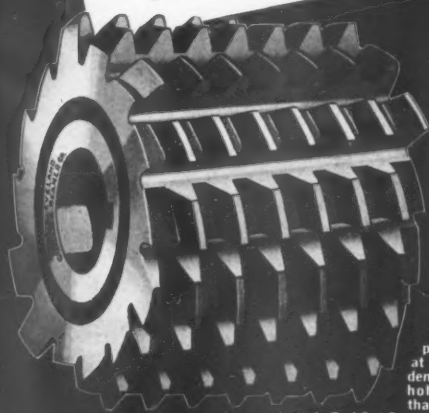
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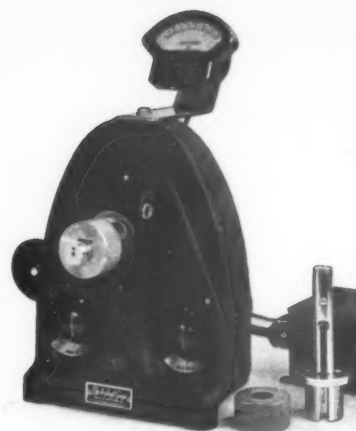
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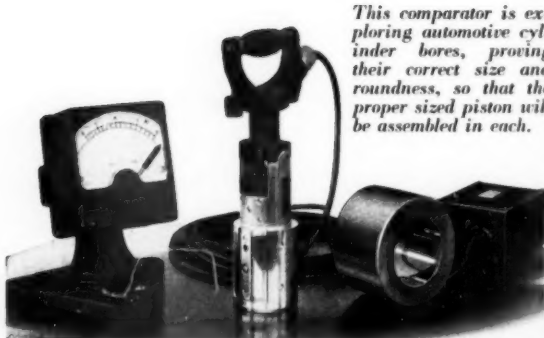
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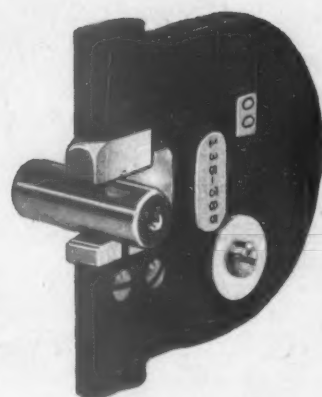
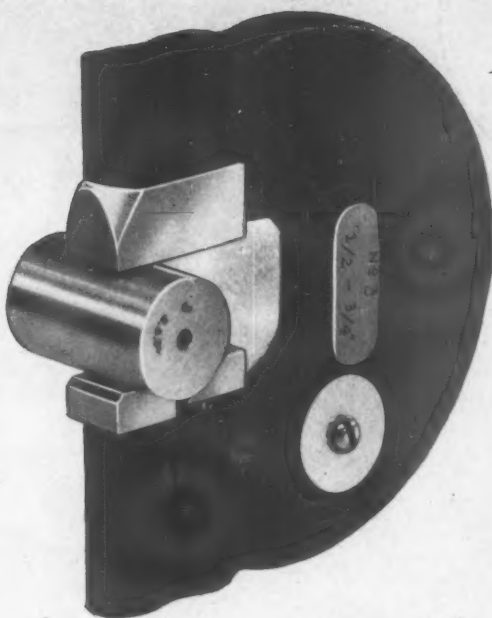
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Vol. VIII.

MAY, 1939

No. 1.

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Owing to the nature of the American Society of Tool Engineers, a technical organization, it cannot, nor can the publishers be responsible for statements appearing in this publication either as papers presented at its meetings or the discussion of such papers printed herein.

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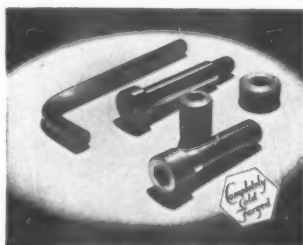
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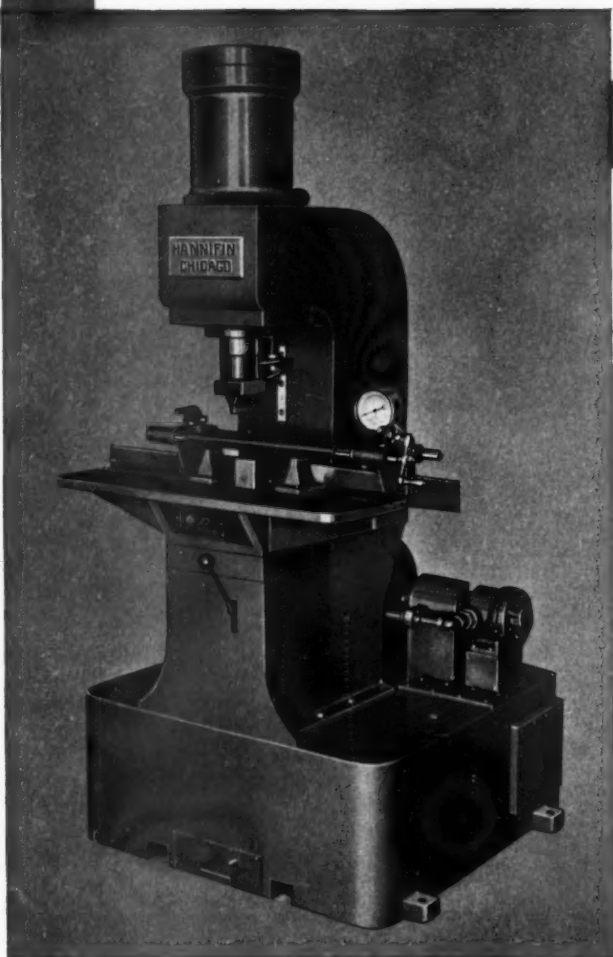
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HYDRAULIC
PRESSES

By-Product

An Editorial

By

A. E. Rylander

A GREAT corporation, engaged in the manufacture of automobiles, sells by-products of coke and engine fuels, manufactures and sells ultra-precision gages. Another automobile concern manufactures and markets an improved air conditioning unit for homes, evolves a superior surface finish of inestimable value to industry, sells it. Yet another produces refrigerators and lighting systems as side lines; a machine tool manufacturer creates mirrors and lenses for high power telescopes. All of this may, loosely, be termed by-products of the regular line of endeavor. Why a by-product? Well, for a number of reasons. Reduction of ores and processing of materials result in wastes alien to the regular product but of potential commercial value in other fields. Gasoline, for instance, once considered an annoying by-product of kerosene, revolutionized transportation; now, low grade fuels the cheaper, we revolutionize the engine. Then, too, most large corporations employ creative talent that, inevitably, strays from a beaten path of thought. Creative genius, you know, is seldom single tracked, and without this estrayal there would be little of invention with a resultant paucity of new things.

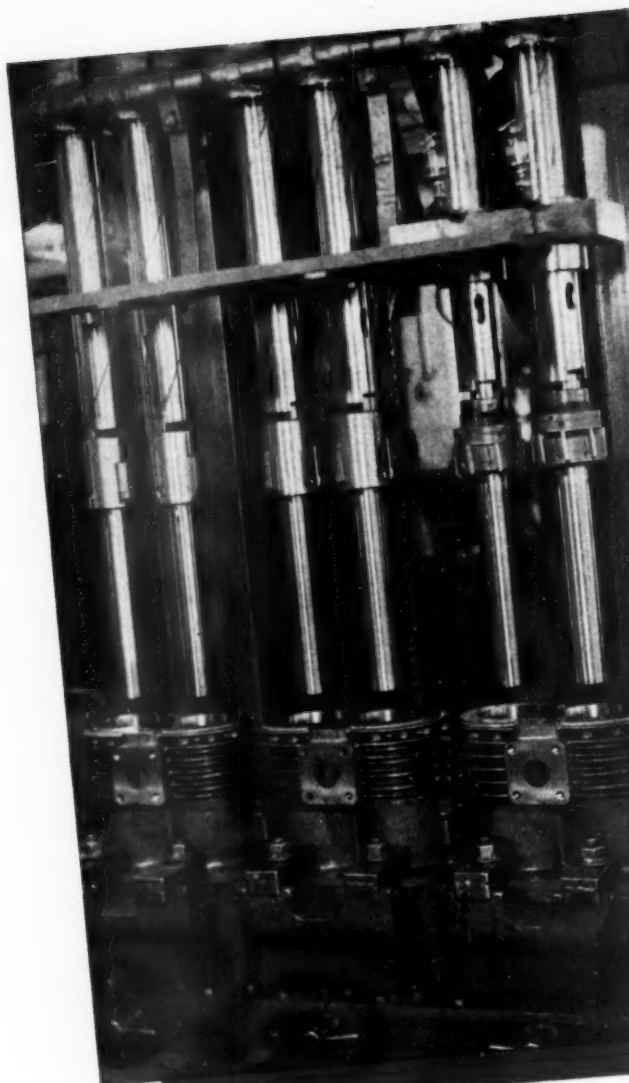
The research worker, striving for an objective, notes aberrations in his formulae, shelves them for future reference. Another, idly pouring some acid into a light bulb, accidentally drops it; to his surprise, it doesn't break. Evolving a lamp that gives more light for the current consumed, he finds that he has also produced one that is far safer for the user. Free lancing or employed by corporation, research workers all over the world vie to divert by-products into useful channels, so, we get dyes and medicines, plastics and artificial lumber, the myriad of new things so essential to the scheme of a progressive civilization.

Even an organization like the American Society of Tool Engineers produces by-products, if of a more intangible nature than the products of manufacture. The Society's main line is the promulgation of the Science of Tool Engineering, but as it grows and gathers resources, augments its brain power, it explores and opens new and important vistas. That, of course, is true of any ethical engineering society, most of whom have given to the world ideas and standards quite beyond the horizon of the original concept. Problems of design have embraced metals, as questions of strength have embraced everything from silks to alloy metals, from prime movers to hydraulics, and so on ad infinitum.

The American Society of Tool Engineers, however, is unique in that it has considered the human equation, this entirely aside from the good fellowship which is a keynote of the order and which has largely contributed to its success. Latterly, there has come about a consideration of the future of our young engineers, among whom are included not only the student in the college but the ambitious youngster in the tool room or out on the production line. This has come about because, while leaders in the Tool Engineering profession are highly trained and, on the whole, educated and intelligent men, most of them had to achieve their spurs by the hard road of practical training; they know the rigors of that road, have consideration and sympathy for the beginner who would essay it.

We may not hope for immediate results from this interest in our future Tool Engineers, since this is an age of transition that must needs bridge the opportunities of yesterday with the still greater opportunities of tomorrow. But it is a fine and splendid thing that constructive, far seeing men should interest themselves in human problems, should strive, in a practical way, to encourage a generation that, by force of circumstances, finds barriers to paths that were open to their elders. This, in passing, is but one of several by-products of the American Society of Tool Engineers; in time, we shall see fruition of ideas conceived.





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The Bogey Man of the MACHINE SHOP

By
HUGO A. WEISSBRODT



**Hugo A. Weissbrodt, Assistant Superintendent
International Harvester Company, Fort Wayne
Works, Fort Wayne, Indiana.**

UNDOUBTEDLY the above title has aroused your curiosity to read this article, and if you should hold a position as a plant executive or Tool Engineer, may I invite you to continue to read on, as I will endeavor to eliminate any formal introduction and arrive at the meat of the subject at once.

Upon the arrival of a new machine tool in your plant, completely tooled for your approval, one usually is content with having his money's worth and pays the bill. On the other hand, when one receives his monthly perishable tool costs in the form of a budget, burden statement, or over-head; he usually discovers that this item is comparatively the greatest expense in the machine shop. There is a reason behind all this and I believe that after due consideration one will be more aware of this, so let us delve into this item further and analyze the causes for this extreme expenditure.

Retracing our steps to the machine tool fully equipped and carefully scrutinizing the perishable tool set-up, especially the size of the tool bits, one probably finds larger tool bits on the turrets and tool blocks than are necessary to carry away the heat as well as obtain the desirable tool life. For example, if the tooling calls for a $\frac{1}{2}$ " x 1" tool bit stock, where, in many instances a $\frac{1}{2}$ " x $\frac{1}{2}$ " bit properly supported will give the same results; consequently, a savings of the original investment of the tool bits as well as the replacement and grinding time is made. With this example in mind I will further explain the application of corrective measures to this problem.

Modified Mnemonic Symbol System

Everyone associated with the problems of perishable or cutting tools, as used by our modern automotive plants, is aware of many difficulties that present themselves from time to time; and of the tremendous savings that can be made through concentrated effort being given to this subject. Recently we installed a new tool system, which we feel is a forward step along this ever approachable subject. This system was started with a "Modified Mnemonic Symbol System" as a basis, and is used to solve many problems, namely, as a means of rapidly identifying various classifications of tools, with reference to their heading or group prefix letter; which is of benefit in the tabulation of these tools, by the Tool Design Department, Tool Grinding Room and Manufacturing Foreman.

Prior to the system now used, high speed tool bits presented a problem disastrous in itself; as it was left to the discretion of the operator to grind his own tools. This in itself was responsible for the loss of many dollars, time, and a waste of tools, due to the many

ble thought as to size, grade of material and grind required. These tools are ground to the angles producing the best results, and placed upon trial and under constant supervision for a period of several days.

At the end of the trial period, if the tools have proven satisfactory to every one concerned, drawings are made and these tools listed in the departmental and stores department records, to be used exclusively on these operations, resulting in the reduction of the various sizes of tool bits and types of grinds as, heretofore, used.

Simplicity

The simplicity of this system has resulted in a saving well worth the time and effort spent to develop it. Through a survey conducted in the plant, it was found that after the new system was in effect; there were occasions where one particular grind could be used on as many as fifty or more different applications of like operations; where, heretofore, there was a possibility of an equal number of different grinds, all depending upon the discretion of the operator. This resulted, not only in a tremendous saving on tool bit stock, but also the reduction of large quantities of tools carried in stock. Being of similar grind and size, tool bit shapes can now be ground on a production basis. To further aid the grinding operator, sheet aluminum templates or gauges are developed for each tool of different size or grind; which insures consistency of grinding, plus ease of checking by the grinder hand.

The possibilities of this system are unlimited, as an example, let me refer to designing of new tool bits. In the future, tool blocks and holders will be designed to accommodate tool bits that at the present time are carried in stock, and the size and grind pre-determined. This will reduce designing time to a minimum, and is materially effective in the reduction of a bank of tools to be carried in the stores department and departmental crib.

During the process of the above mentioned survey, one finds many conditions where sizes of the tool bit stock can be greatly reduced by using tool bits of pre-determined size and grind; which have been proven on similar jobs, producing a saving worthy of mention.

This system does not only effect the tool bit situation, but may also be applied in a very efficient manner for the classification of reamers, milling cutters, hobs, etc.

The above system adds both in the reduction of direct and indirect labor, also tends to reduce the idle time on your machine tools.

Figure 1 illustrates the practical ap-
(Continued on page 45)

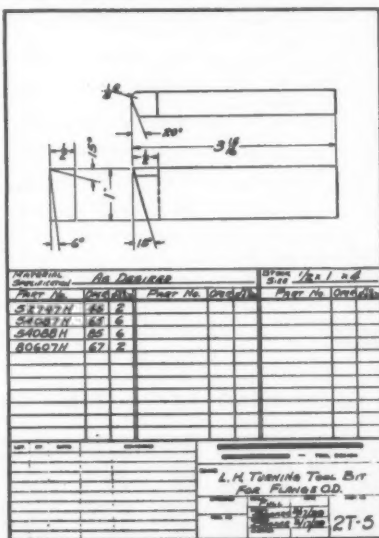
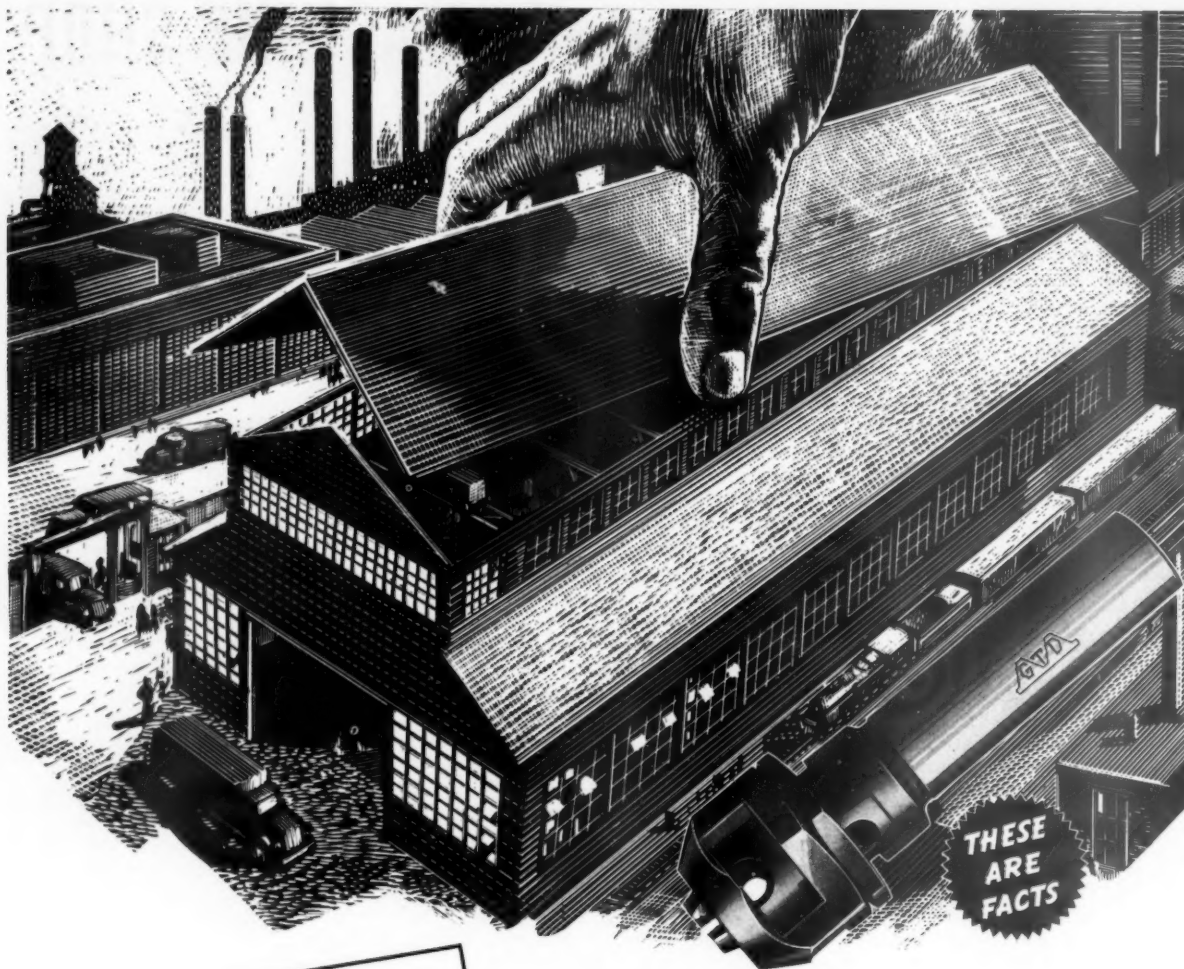


Figure 1.



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THE TOOL ENGINEER FOR MAY, 1939

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HYDRAULICS

THERE has been very little new in the simpler applications of fluid or hydraulic power, as it is generally termed, for it has been used for many years to energize presses, cranes, jacks, lifts, and other simple forms of hydraulic machinery. These and other applications are based upon the fundamental law of fluid, namely Pascal's Principle, which states: "If the pressure at any point of the fluid at rest, be increased, that pressure is transmitted equally in all directions, if the fluid be incompressible." Thus if a piston is pushed downward, the pressure it exerts on the surface of the fluid is transmitted equally to the sides and bottom of the cylinder. To exert a large force by applying a small one, Pascal's Law is put into operation in the form of a hydraulic press. The large cylinder and piston are connected to a small cylinder and piston by a pipe. The system is filled with fluid and the resulting force from the large cylinder is the ratio of areas of the small and large cylinder times the force applied by the small cylinder. In the early hydraulic installations, large accumulators were used as a centralized storage of power and this power in the form of pressure fluid was distributed to the various machines by suitable pipe lines. In this type of circuit, the maximum power is used at all times irrespective of whether it is required. This is due to the head of pressure on the accumulator transmitted to the pipe line at all times. The accumulator type of installation served its purpose admirably and was a definite step in the use of hydraulics industrially. This system, however, had many faults. One failure in the system caused the shut-down of the entire system, and all machines operated from this one central source of supply were put out of commission. It was expensive to maintain and keep in repairs and distribution pipes, and leaks were a common source of trouble. Some of the distribution lines were several thousand feet in length. It was, of course, necessary to have your pressure line, as well as your return line, thereby involving the use of two lengths of long pipe, in many installations. Considerable friction losses resulted from this type of installation, due to the length of pipe and the number of elbows, fittings, etc., required to conduct the fluid pressure from the accumulator to the various machines. Therefore, in the early days, the accumulator type of system was applied generally to the simpler forms of operations, such as presses, etc.

What is "Hydraulic"

One of the best definitions I have learned, applying to the word "hydraulic" is "The science of liquids in motion and the application of the forces which influence the motions of liquids for practical purposes." You have all learned during the past few years of the broad developments in hydraulics and their applications. From the definition, we

By

J. C. COTNER

CHIEF ENGINEER
LOGANSPOUT MACHINE, INC.

have learned the science of liquids in motion, and we have learned how to apply the forces to influence the motions of liquids for practical purposes. Variable delivery pumps, constant delivery pumps were developed for unit installations, and from the development of these pumps started the broad application of hydraulics in industry. After the pumps had been developed, it was only a matter of a short time until suitable valves and controls were developed, for the controlling of the forces developed by these pumps. From these forces many types of hydraulic applications have resulted. Machine tools are operated hydraulically. Processing machines are operated hydraulically, and, in fact, it would be hard today to name any industry in which hydraulics today are not playing a very important part. Hydraulics are being used extensively in the automotive plants, the steel plants, the electrical manufacturing plants, road machinery, excavating machinery, steel mills, packing plants, the printing industry; in fact, I do not know of any industry in which hydraulics in one form or another are not being used.

A Comparison

Hydraulics or fluid power may be compared to the voltage of an electric generator. The discharge from the hydraulic pump is similarly related to the rate of current flow or amperage. Instead of two or more wires, two pipes are used to transmit the hydraulic transmission. The pressure and discharge pipes correspond to the negative and positive leads of an electric generator. Due to its similarity to electric current, fluid power may be transmitted over long distance, over, through, or around obstacles, into positions inaccessible by belts, chains, gears, or other means of power transmission. Due to this ease of transmitting hydraulic pressures, as compared to the many mechanical power transmissions, its adaptability has become very broad and is being used or considered by all machine designers in their daily problems of machine development. The resemblance to electric power can be carried still further for fluid power may be interrupted, reversed, or varied in intensity almost instantaneously without stopping or changing the speed of prime mover or stopping the prime or the pump unit. A piston can be made to rise or fall by valve control in an unlimited diversity of ways. If the horizontal distance represents the time required for a complete cycle of operation and the vertical travel of the ram is limited, it is possible by hydraulic means for the plunger to start and terminate in any manner that the designer desires. The unlimited flexibility of hydraulics is

recognized by most designers and by this flexibility many of the difficult problems with which they are confronted today are solved or greatly simplified. The commercial valve controls available today on the market provide for many operating circuits. With their use, we can secure rapid advance, feed, skip, feed, dwell, and automatic reversal to the starting point, or we can have the same circuit duplicated at each end of the cylinder stroke. Further, we can secure controls that will automatically in sequence control a number of cylinders to secure a number of definitely related motions. We may have two or more cylinders in a circuit, and by the use of reducing valves, regulate the pressure exerted by the several cylinders, according to the requirements in the process. This pressure is quickly adjustable and can be regulated instantly to the requirements of the process. These controls can be secured for either hand or foot operation, electrically operated, mechanically operated, remotely operated, or a combination of all of them, so that from this you can readily see that the manufacturer of hydraulic controls and equipment today is in a position to solve practically any industrial problem, requiring the use of fluid pressures.

Pumps

Referring to pumps, there are today on the market, a large number of good commercial pumps. They are generally of the piston type, vane type, gear type, or a combination of several of these, and they can be purchased for either constant delivery or variable delivery, and from small volumes to large volumes. The pump is, we might say, the heart of the system. Any good pump that will give long operation without trouble is really the heart of any circuit. It should be quiet in operation and capable of delivering the maximum pressure for which it is used continuously over a long period of time without interruption for repairs or service. One advantage today to the pump manufacturers is the use of a high grade refined oil in the circuit which acts as a lubricant for the working parts of the pumps and greatly extends their life. It is also possible to obtain today commercially hydraulic transmissions for variable speeds, and they are being used extensively in the operation of conveyors, paper machinery, printing presses, etc. where variable operating speeds are required.

Another very important item in the hydraulic circuit is the hydraulic cylinder. There are available today commercially, many types of cylinders, consisting of bores from 1" up to 20" and of practically any stroke required. Naturally, the manufacturers of these cylinders have their own ideas as to the best design features to incorporate

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Tool Engineers Must Qualify for Greater Responsibilities

By

DON FLATER

WORKS MANAGER, CHRYSLER DIVISION
CHRYSLER CORPORATION

TOOL ENGINEERS spend considerable time keeping up to date on equipment, methods, etc., and perhaps give little thought to Management's requirements for executive supervision. In past articles, in this Journal, we have stressed the sources where the engineer may obtain information that will assist in rounding out his experience in line with Management requirements but have not definitely pointed out just what these requirements are.

When your past president, Mr. Smila, first got me interested in the A.S.T.E. I possibly did not give sufficient thought to just what opportunities really existed in it. As you all realize, or at least should realize, Management is continually in search for men with executive ability. In fact, that possibly is one of our greatest functions as more business failures are attributed to lack of executive experience than any other one cause. After giving considerable thought to the A.S.T.E., it suddenly occurred to me, why weren't Tool Engineers a good source from which we could train supervisors.

I do not believe that in any of the metal trades manufacturing that there is any one asset as advantageous to the individual as that of being a mechanic. In my estimation a mechanic is a good mechanic at home, in the shop, on the board, in Time Study, in Plant Engineering, or any other branch of manufacturing. Perhaps his experience will not be such as to make him efficient in all these positions but he certainly will have a base to work from. This mechanic will have put in as much effort and time learning to be a first class mechanic or perhaps even a longer time than the doctor or the lawyer extends in becoming a master of his profession. I have heard a good mechanic make the statement that he wished he knew as much and had as much education as a doctor or an attorney. If Engineers will carefully analyze they will find that they have put forth perhaps a longer time and certainly a lot of effort, and the tribute should be paid them that they possess just as much knowledge in their line of work as do the doctor and the lawyer. A doctor, called on a case in which the ailment is not obvious, may have to make an extensive diagnosis, resort to laboratory analysis, or brush himself up from his library on symptoms which his patient may have.

Machine repairmen and tool trouble men on so-called flying squadrons are hastily called to immediately repair a big multiple machine on which perhaps the entire production in the plant depends. These machines today, with their hydraulic and electric set-ups that have all the appearance of a radio station, require painstaking diagnosis to find out just what the mechanical ailment is.

Few instances occur where over a few hours elapse because the mechanics were unable to diagnose the trouble. You will say that this diagnosis is simple compared to a patient, and in a lot of cases it is; but the patient can talk and he can tell you where his aches and pains are, whereas the machine cannot, nor do you on the machine have any diagnosis charts to tell you just what the trouble might be. Therefore, do not get the idea that your occupation is not just as technical and as illusive as that of any other profession.

Basic Qualifications

The good mechanic must possess certain basic qualifications before he can become proficient in his line of work. He has a natural bent of curiosity, is intelligent, and in the biggest percentage of the cases, enjoys his work. He has a working knowledge of tools, machines, equipment, and has had enough personal contact with individuals to educate him in the personalities of people. These qualifications naturally are basic requirements for greater responsibilities.

Sometimes we misinterpret just what the word "mechanic" means, but I believe Webster's definition of it comes as near meeting Management's requirements as any. Webster's definition is "an intelligent workman." To be a good craftsman, naturally one must be intelligent and certainly a good Tool Engineer should be a good craftsman, therefore, must possess intelligence. Anyone with intelligence and a will to work certainly has great possibilities of branching out into further responsibilities. I believe it advantageous for any supervisor to be familiar with mechanics whether it be the supervisor of accountancy, labor relations supervisor, budget control supervisor, or any other of the numerous occupations in a factory.

A resolution made and aggressively followed out will eventually lead to the goal you are striving for. Might also mention that men who attribute failure to hard luck tend to have poorer personalities than those who blame themselves. The former regard themselves as victims whereas the latter believe they can do something to improve their success. People who say "I can't help it" tend to be less aggressive than those who will not admit permanent defeat, the latter keep on trying.

Years ago, after obtaining a mechanical background, I became greatly interested in people themselves, which some of our technical men nowadays would class as a study of human engineering.

I became interested in this subject after considerable thought and as the realization came that machines will never replace men. After all, it will always be necessary to have men to operate machines, men with brains to design machines and men who are mechanics to build the machines. You can re-design a machine, you can repair it, and you can make it work, providing there are men available with brains to do it. On the other hand, getting a man to perform a task is a different proposition. He requires considerably more study than this as he has a mind of his own which is perhaps as brilliant as yours. It is the responsibility of all of us to see that our working associates are instilled with ambition to advance themselves.

A Challenge

Your past President, Mr. Wagner, in the March issue of "The Tool Engineer," told you what a Tool Engineer is; however, he makes one statement which I would challenge, or perhaps I do not see Mr. Wagner's interpretation. Mr. Wagner says, "unfortunately he, the Tool Engineer, is classified within the ranks of non-productive help in the bracket of overhead, a burden industry endeavors to curtail. More often than not, his only satisfaction is a job well done—a tough problem licked—a few cents or dollars saved on a part here and there—a new method of processing a part—leading to decreased costs, greater accuracy, higher efficiency." Why should we curtail non-productive help? They are the mechanics, the technical advisors, and the backbone of any manufacturing organization. "His only satisfaction, a job well done." What greater satisfaction is there than a job well done?

The Tool Engineer is placed at the seat and source of basic knowledge and where more opportunities exist to fit himself for greater responsibilities than most of the positions that a factory affords. You hear every day of men who started as messenger boys and clerks, becoming important executives. I can name you twenty men that are Presidents, General Managers, Works Managers, and Master Mechanics that have come up through the experience that tools drilled and shaped into them. My advice to you is lick the tough problem, reduce the cost, find the new ways to process the part, promote greater accuracy, increase the efficiency, as Mr. Wagner mentioned, learn the other fellow's job, develop the right personality and a portion of you who can and will do the above will end up with a greater satisfaction than a job well done.

Mr. Rylander, in his editorial in the March issue of this Journal, explained with substantiating evidence that the Tool Engineer is the key man of indus-

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"Toward Abundance"

OVER production . . . Technological unemployment . . . Under consumption . . . Share the work . . . Shorter hours . . . No speedup . . . All are slogans developed from a depression psychology. Men defeated in an economic storm, holding fast to what little is left, reading and hearing the many theories of cause and cure, that come from a glorified and expanded group of well intentioned helpers, such as gathered around a stalled automobile in 1910, each with a logical sounding explanation, vehemently argued against the equally logical reasoning of another, but all lacking the essential of knowledge and experience.

Tool Engineers are at the focal point of this discussion because their work is the development of tools and machinery that, according to many of the self-appointed experts, causes much of the economic trouble of today. There must have been many occasions when you have asked yourself if your work is good for you but harmful to society.

There are three major problems in the economic world of today. They are: (1) Unemployment; (2) Distribution of the goods we make; (3) The standard of living. It will be useful to analyze the effect of the Tool Engineer on each of these problems but, in doing this, it will be necessary to establish some of the fundamental principles of economics as a starting point.

The first problem . . . "unemployment and its cause," is shrouded in the mysteries of a thousand theories. We know, in engineering, that any attempt to analyze the forces in a complicated system is doomed to failure, unless it is simplified to the point where we can study the effect of changes on a single factor, uninfluenced by changes in other factors at the same time. Now, in our modern economic system, we have tremendous complications in the exchange of goods, services, and money. Essentially they are all alike, in that it is an exchange of the products of human energy for money and a re-exchange of money for different products. For simplicity, let us consider that these products are all goods that we commonly use, such as food and clothing. For easy visualization, let us further consider a completely self sustaining community to be represented by five men who produce the goods and one man who represents the market for the exchange of the goods.

A cycle of change may then be represented as follows . . . The five work for a period (say one week), and at the end of the week bring the products of their energy to a central place called the market. They deliver the products

By
JOSEPH E. PADGETT
VICE PRESIDENT
SPICER MANUFACTURING CORPORATION
TOLEDO, OHIO

to the market and each receives, in return, a sum of money representing the relative value of his product as determined by the law of supply and demand. Each then takes the money received, and, with it, purchases goods that he needs from the market. If all the money is thus re-exchanged for goods, then all the goods brought to the market will have been redistributed among those who brought them, not uniformly, but in proportion to the relative value of the contribution each has made. The money will have been returned to the market ready for another cycle, having served its purpose as a medium of exchange.

Suppose now, at a future time, one of these men who has been thrifty, finds he has sufficient goods saved to take care of his needs for the coming week, and, after getting his money from the market, decides to save the money until some later time, when he can use it to better advantage. The result is that goods approximately equal to the product of one man are not sold and remain in the market, while the money saved is not returned to the market. The effect of this is not noticed until the next succeeding exchange, when it is found that there is not enough money to pay for the product of the five men, and, furthermore, the unsold goods in the market prevent the acceptance of an equal amount of new goods. The only way to balance this exchange deficiency is for one man to stop producing, that is, become unemployed, or for several to work only part time. This situation will continue as long as the money is hoarded in the form of money. Here, then, is the basic cause of involuntary unemployment. It is caused by the hoarding of money.

It is impossible in so short a space to go into all the phases of exchange in the money system. The effect of borrowing, speculation, price, and many other forces, cannot be discussed, but the particular condition we wanted was the cause for unemployment which is the hoarding of money. Do not confuse this with the broad term of saving. Goods may be saved without this result. Money may be saved and reinvested in anything without causing unemployment because, in these cases, the money returns to the market for use once more. Banks and individuals that control large amounts of money keep employment full, provided this money

is invested in farms, houses, and commercial enterprises. Any force, such as speculative price changes or government policies of taxation, inflation, spending, etc., that induce money hoarding, cause unemployment and also the evil of hoarding money.

The question of . . . "technological unemployment" should be changed to "technological displacement." For instance, suppose two of our five men make the same goods and one of them discovers how to make twice as much with the same effort through the use of some machinery. The second man is now in the position characterized as technological unemployment. However, if you will trace through the process of exchange, you will find that there remains in the market, or in the hands of the first man, or in some proportion between, money, not used for other goods, sufficient to pay the second man to provide some different kind of goods. He must learn a new job, and this is the only penalty, while everyone, including himself, gains increased abundance, since there will be more goods produced and exchanged, with no increase in human effort, after the second man has learned to produce some other needed product.

Technological displacement, yes. Increased abundance, yes. Permanent unemployment, no.

In a free economy, there will be great differences in reward due to the action of the law of supply and demand since we are all happy to pay unusual talent, more than ordinary skill. The important point, however, is that as we increase

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JOSEPH E. PADGETT

PIERCING WITHOUT PRESSES

Considering the trend to hydraulics, the piercing units outlined in this article are suggestive of many applications of hydraulic equipment to metal processing. Cold riveting, piercing, forming and coining are entirely practical and economical with hydraulic units, various makes of which are already on the market and many others in process of perfection. Mr. Gorham deals, here, with proven applications of particular interest to Tool Engineers.

DESIGNED to meet a growing demand for methods of piercing holes in intricate stampings, in any direction, a recent development in hydraulic piercing—the Hydro-Pierce Unit—will prove of especial interest to Tool Engineers in general and stamping shop executives in particular. True, die designers evolve ingenious, compound dies which, with large, modern presses, will pierce holes in horizontal and vertical direction, but the initial and incidental cost, for equipment, tools and upkeep, is often prohibitive. Holes that cannot be pierced in one operation entail extra dies or drilling operations and usually result in a product which has not the uniform hole spacing necessary for good and easy assembly of mating parts.

Now, by resort to hydraulic piercing, holes can be pierced in any direction, with the advantage that power can be conveyed around corners and into places that could not be reached with conventional tools. The result is a fixture, rather than a machine, that will pierce all holes in a complicated stamping in one operation and one set-up,

By
RALPH B. GORHAM
MIDWEST PRODUCTION ENGINEERING, INC.

thus insuring a uniform product and an easier job on the assembly line. Holes may even be pierced after reinforcements have been welded in place, thereby reducing the number of operations. And, since the hard blow action of the average press is done away with, punch breakage is reduced to a minimum and clearance between punch and die may be reduced, resulting in a smoother hole with practically no burr.

The construction of the unit renders it readily adaptable to engineering changes in the product, or for interchangeability of stampings for various models. Thus, an obsolete part does not mean an obsolete tool; the unit can be adjusted to suit the new design.

The unit consists of a cylinder, solid piston with rings, the plunger shaft attached to a punch holder which carries the punch or punches, stripper, springs

and screws, and gibs for the punch holder, all mounted on a casting which is slotted for the necessary keys and drill for hold down screws. An alternate style has the base extended to carry the die button, which insures correct alignment of punch and die should the unit be moved for any reason. Bores, ranging from 1¼ to 6 inches



Figure 2. Showing a more complicated type of fixture, designed to employ hydraulic piercing and drilling units of three different sizes. The cylindrical parts in which the holes are pierced are shown in the inset.

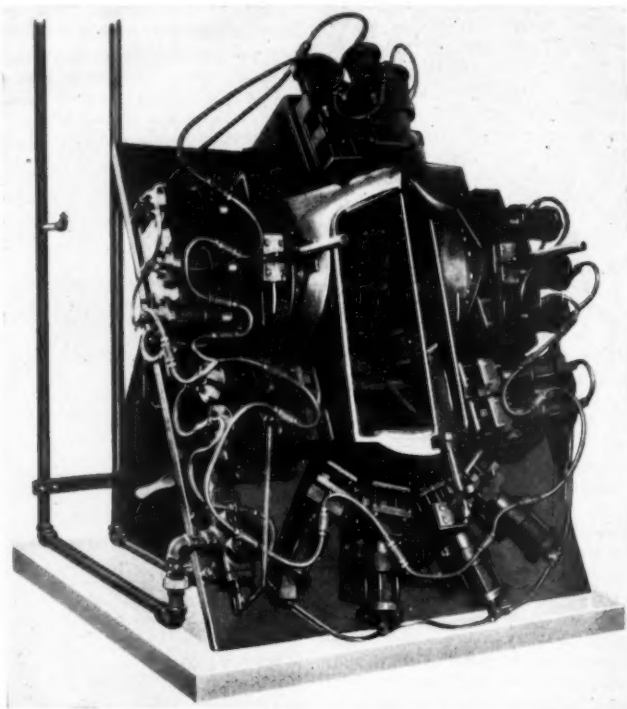


Figure 1. Piercing machines, for piercing all holes, lace holes, fender flanges, etc. in a radiator shell for popular make motor car. Nineteen piercing units are used, some carrying as many as five punches.

produce pressure from 1 to 28 tons. By staggering the lengths, multiple holes may be punched with comparatively little power, so that smaller units can be used. Strokes in all bores vary from 1 to 6 inches, although 3 inches is recommended to allow for removal of broken or dull punches.

Power is supplied by a hydraulic power plant which, built as a separate unit, may be incorporated into the fixture or conveniently located. It can be suspended from the ceiling, shutoff valves and flexible connections permitting fixture proper to be moved after a production run and another substituted. The power plant has ample pressure and capacity to compare favorably with a press, in strokes per minute, in performing similar operations. The standard power plant, producing 2000 lbs. pressure, is built in several sizes, the largest with a capacity of 75 gallons per minute. The plant uses a high volume, low pressure pump for rapid feed stroke and a high pressure booster for the piercing, the latter operating automatically at the correct time. Since the units will operate in any position fixtures may be built to suit loading and unloading of parts instead of loading under a ram or between uprights

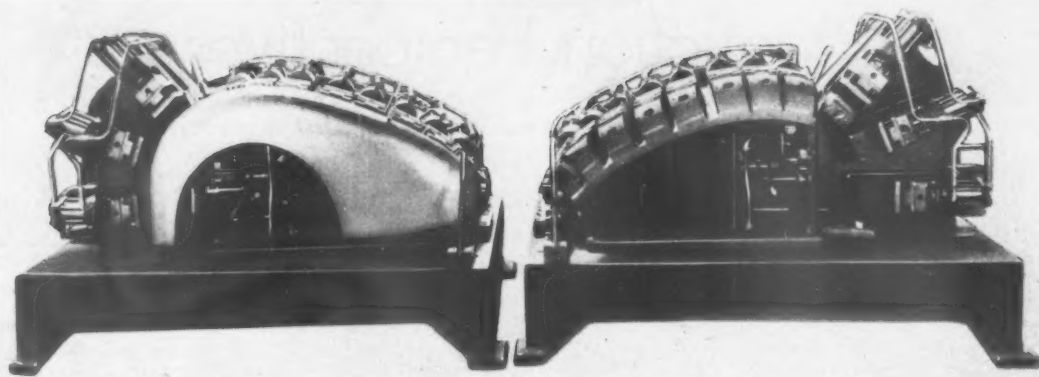


Figure 3. A simple type of fixture for the application of the "Hydro Pierce" unit for punching automobile rear fenders—one for the left and one for the right fender. A fender is shown in position on the fixture at the left. The mechanism can be seen in the fixture shown on the right.

of a press. This is a safety feature of valuable consideration. In many cases holding clamps are necessary, in which case hydraulically operated toggle clamps may be used.

Applications of the Hydro-Pierce are shown in the illustrations: Nineteen piercing units were used, some carrying as many as five punches in the machine shown in Figure 1. All reinforcements were welded in place making .110 of stock to be pierced. The part is clamped on the fender flange and nose which assures the manufacturer of a perfect fit on the fender hood. After a year's production was run off, the machine was revamped to produce the part for the next year's model. Sixteen of these units, some of them requiring no change, the power plant, machine base, fittings, tubing and operating valve were again used. In fact, the only new parts necessary were the inside die form and some filler plates under the units.

A more complicated type of fixture is shown in Figure 2. This fixture was designed to employ piercing and drilling units for the piercing and drill of three different sizes of metal cylindrical parts which, for want of a better name, we will call "bowls." In some of the bowls all of the holes are pierced and in some the holes in the periphery are pierced and those in the radius are drilled. As can be seen in the illustration, the drilling units are mounted on angular bases. To operate the machine, the operating lever is moved forward, opening the hydraulic circuit and applying pressure which causes the dies to move out against the work the four piercing units to move in and perform the piercing operation. The lever is then reversed, causing the dies to move away from the work and stripping the punches, after which the bowls are automatically indexed nine degrees to position for the next holes. After the piercing operation, the bowls which require holes in the radius are drilled. The drilling units are controlled by a lever at the left of the machine which is moved forward opening the circuit and applying power to operate the four hydraulic drilling units in the same manner as

the piercing units. Thus both rows of holes are processed rapidly and accurately with an automatic nine degree index and without handling of the work until the operation has been completed. An interesting feature of the job consists in that the small holes are 0.085-in and are pierced in drawn stock which is 0.107-in thick.

Figure 3 shows a simple type of fixture for the application of the piercing unit. Two fixtures are shown for punching automobile rear fenders—one for the left, and one for the right fender. Eleven units are employed on each of these fixtures, eight to pierce holes in a horizontal direction and three to pierce holes radially in the curved section of the fender. A fender can be

handled into and out of one of these fixtures with comparative ease. The punching units operate almost instantaneously upon operation of the hand lever which can be seen at the right end of the left hand fixture.

The fixture shown in Figure 4 was designed for application of hydraulic piercing units for the piercing of six holes in steel chair frames. A small amount of forming is involved around the hole. The fixture is of a comparatively simple and inexpensive construction being built up of steel angles and plates cut to the necessary length and shape and welded together. Such a fixture can easily be designed. The fixture proper, in which the frame is

(Continued on page 32)

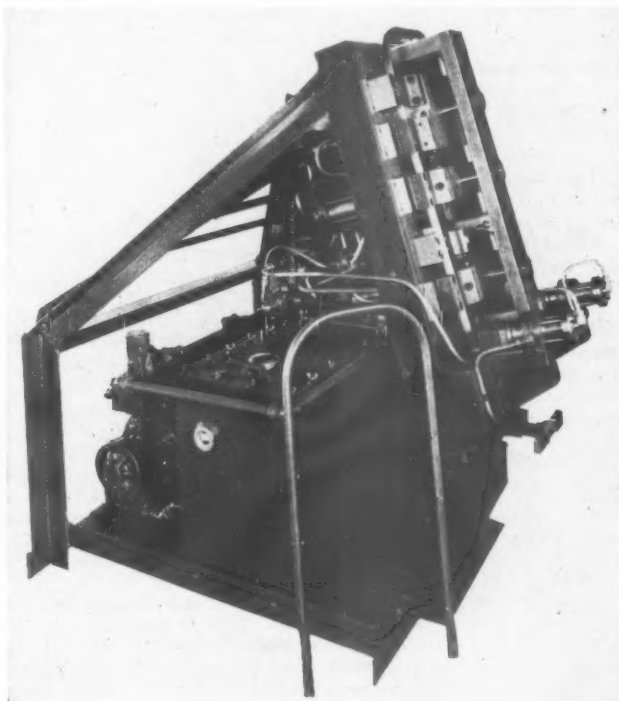


Figure 4. This fixture was designed for the application of the hydraulic piercing units for the piercing of six holes in steel chair frames. A small amount of forming is involved around the hole as can be seen in the simple frame shown in the foreground resting against the corner of the fixture. This fixture is of comparatively simple, inexpensive construction, being built up of steel angles and plates cut to the necessary length and shape and welded together.

Production Perspectives

News of Mass Manufacturing from Everywhere

IN spite of currently unsettled world affairs and "war-scares" there are many indications which would seem to substantiate the feeling, that many business men have, that business generally is not due for a decline and that events across the seas are not having anywhere near the effect on actual business in this country that some may assume. **Automobile production with practically every company reporting is way up, considerably ahead of last month or the same period a year ago and business in many quarters is exceptionally good.** Large expenditures are being made for capital goods which is an unusually favorable sign of the times. For instance, announcement has been received from Cleveland that the **Erie Railroad** on April 15 placed orders for 15,167 gross tons of new rails, business of the **Timken-Detroit Axle Company** so far this year has shown considerable improvement over the like period of 1938, while the month of **March** was the largest from the standpoint of volume of domestic orders for new machine supplies for any one month for the **Addressograph-Multi-graph Corp.**, while open hearth and Bessemer steel ingot production rose to the highest for any month since **November, 1938** when the peak was established, according to the American Iron and Steel Institute report on April 7. **Machine tool orders advanced sharply** in March for the fourth consecutive monthly rise bringing the monthly index of the National Machine Tool Builders Association to 185.4 from 167.1 in **February**. The index which takes average monthly shipments in 1926 as 100, was highest since September, 1937. Domestic orders increased in March while foreign business, which has remained fairly stable the last six or seven months, continued at the February level. **Plate glass manufacturers of America report March plate glass production by members at 11,866,817 square feet, as compared to 10,165,401 in February and but 3,802,111 a year ago.**

Mid-west

Lewis M. Crosley, executive vice-president of the **Crosley Radio Corp.**, Cincinnati, recently made announcement that the small automobile upon which the **Crosley Corp.** has been at work might make its appearance in the near future. Rumors of such a development have been heard for some time. **American made synthetic materials are making the United States independent of foreign raw material supplies** and also provide better manufactured products, particularly in paints and enamels. **N. E. Van Stone**, vice-president of the **Sherwin-Williams Company**, Cleve-



Col. Sam M. Nicholson, outstanding figure in American manufacturing during the past half century, died April 7 at the age of 78 in Providence, R.I. Since 1879 he had been with Nicholson File Company, last serving as President.

land, indicates that since 1920 the paint chemists have found short cuts that enable the enameling of washing machines, stoves and other appliances in from three to five minutes, and the drying of interior paints in a couple of hours. It was also stated that one-coat refining enamels now cover better than five coats did ten year ago. Much of this improvement is due to the use of synthetic resins made of carbolic acid, glycerine, acetate or urea materials which replace the natural gums derived from the sap of African trees. The Sino-Japanese conflict shut off supplies of China's tung oil, which caused a search for a substitute in this country and which has led to the quick-drying enamels and varnishes made from chemically dehydrated castor oil. Groves of newly-planted tung oil trees in Texas are also beginning to produce an even higher grade of oil than the Chinese supply, it was stated.

The **Tinnerman Stove & Range Company**, **Fulton Road, S.W., Cleveland**, will build a new building, the structure to be one story, 50 by 100 feet of steel sash walls, steel frame and concrete floor.

The **National Carbon Company**, **Fostoria, Ohio**, is building a two-story laboratory building there. The building will be of reinforced concrete, with glazed tile interiors, with equipment it will cost \$100,000.

Twin Coach Company of Kent, Ohio, has received an order for 120 new busses to be operated in the World's Fair area in New York City, officials

announced. The busses will carry 40 passengers each and will be operated by the **North Shore Bus Company** of **Queens Borough**. The order for \$1,300,000 swells the **Twin Coach** bookings to more than \$2,250,000 and officials say this will insure steady employment for the firm's more than 600 employees through July.

From Cleveland also comes announcement of the appointment of **Walter F. Munford** as assistant to the vice-president in charge of operations of the **American Steel & Wire Company**, with plants in Cleveland and in Worcester, Mass. **Mr. Munford**, formerly superintendent of the company's **Cuyahoga Works**, has assumed his new duties in the main office at Cleveland. **H. L. Jenter**, formerly assistant superintendent, succeeds **Mr. Munford**. **J. D. Baster** has been named superintendent of the cold rolled mills, and **V. H. Leichter**, superintendent of the wire mills. **Mr. Leichter** formerly was assistant superintendent of the **Newburg wire works**, and **Mr. Baster** comes here from the North works in Worcester, where he was assistant superintendent.

Standard Products Company, **Cleveland** manufacturers of supplies for the automotive trade, and domestic subsidiaries reported a substantial new profit for the quarter ended March 31. The upturn in business enjoyed by this company is attributed to recent increases in automobile output and the excellent demand for automobile parts.

The \$50,000,000 **Borg-Warner Corp.** of **Chicago** has acquired the **Pump Engineering Service Corp.**, of **Cleveland**, manufacturers of aircraft pumps and accessories, it was announced April 19. The **Cleveland firm** will retain its present management but will be operated as a branch of the **Chicago Corporation**, according to **Carl Shuler**, attorney for the **Cleveland Company**. Plans for an expansion program by the **Pump Engineering** division were disclosed with filing in **Columbus** of papers authorizing an increase of \$2,000,000 in capital. President of the **Pump Engineering** is **William S. Jack**, while **J. P. Johnson** is vice-president and general manager.

Wooster, Ohio, was confronted by the loss of the city's largest employer, the **United Engineering & Foundry Company**. News that the company was closing the **Wooster plant** and opening a new one in **Japan**, was broken to the business leaders at a surprise luncheon meeting April 18. **H. A. Huston**, assistant to the president of the company, revealed the plans. He said that some of the 200 local employees would be taken to the **Youngstown plant** of the company while a few would be offered the opportunity of going to **Japan**.

You Can Turn It...

Better.



Faster.



.. so much better, that when the Republic Products Corporation, manufacturers of aircraft parts, put a turning job calling for general tolerances of $\pm .005$ on a new Warner & Swasey *No. 5 Universal Turret Lathe—they found the finished parts coming off, holding consistently at tolerances of $\pm .001$.

*Photograph shows this machine working on another part—a propeller shaft plug.

For Less



.. so much faster, that R. Hoe & Co., New York City, cut time on a heavy duty chucking job from 3 hours to 1 hour and 10 minutes, a 61% time saving. The piece, a heavy heat-treated steel forging being turned into a finished gear on a new 3-A Warner & Swasey turret lathe. The photo shows the 3-A machine now working on another job.

.. much less for the Cherry-Burrell Corporation, Cedar Rapids, Iowa. Take these parts made of seamless brass tubing, for example, formed, bored, chamfered inside and out—made in clusters of three—1.4 minutes per piece. The new method on a new Warner & Swasey eliminated a brass casting which required two chuckings.

**WARNER
&
SWASEY**
Turret Lathes
Cleveland

with Warner & Swasey Turret Lathes

CHAPTER DOINGS

By GEO. J. (Jitter) KELLER

With the passing of snowballs and galoshes, comes the arrival of robins, daffodils and another column of Chapter Doings. Believe me, they're coming in better. Most of them typewritten, some of them double spaced and those in long hand becoming more legible which will save your editor the price of new glasses. The trout are biting,



I. M. Dinger, Pittsburgh A.S.T.E. member, who has been transferred to the Lima Works of Westinghouse. Prior to leaving East Pittsburgh, Mr. Dinger served as manufacturing engineer dealing with the purchase and installation of machine tools. He is a charter member of Pittsburgh chapter, and served the past year as Program Chairman. With Mr. John Smith a chapter could be started in Lima—how about it Mr. Dinger?

Andy Rylander's building a new house, Ford Lamb is trying out a new tractor, Roy Bramson is still back of the "8"

About seventy-five couples attended Chicago Chapter's First Annual Dinner Dance, held April 1st. Shown at the speakers' table, above, are all the new 1939-40 officers and their ladies, together with Clifford Ives, outgoing Chapter Chairman, and E. W. Dickett, second Vice President of A.S.T.E.



ball—there's lots of news—just dig it up.

The **Hartford** Chapter's April dinner meeting at the City Club, was of unusual interest for the 85 members who heard Mr. J. Carlton Ward, Gen. Mgr.



O. B. Jones, Founder of the American Society of Tool Engineers, President of the Detroit College of Applied Science and Historian of The Society is latest to be signally honored by election to Honorary Life Membership in A.S.T.E. Mr. Jones is third to be so honored.

Pratt & Whitney Div. of the United Aircraft Corp. give an off the record "coffee" talk on "Aircraft, European and American" which was unusual and interesting, giving information we do not read in the newspapers. Chairman Morris conducted the technical session held in the Gas Co. Auditorium. Mr. Irvin F. Holland gave an interesting resume of the meeting recently held in Detroit by the Directors of A.S.T.E.,

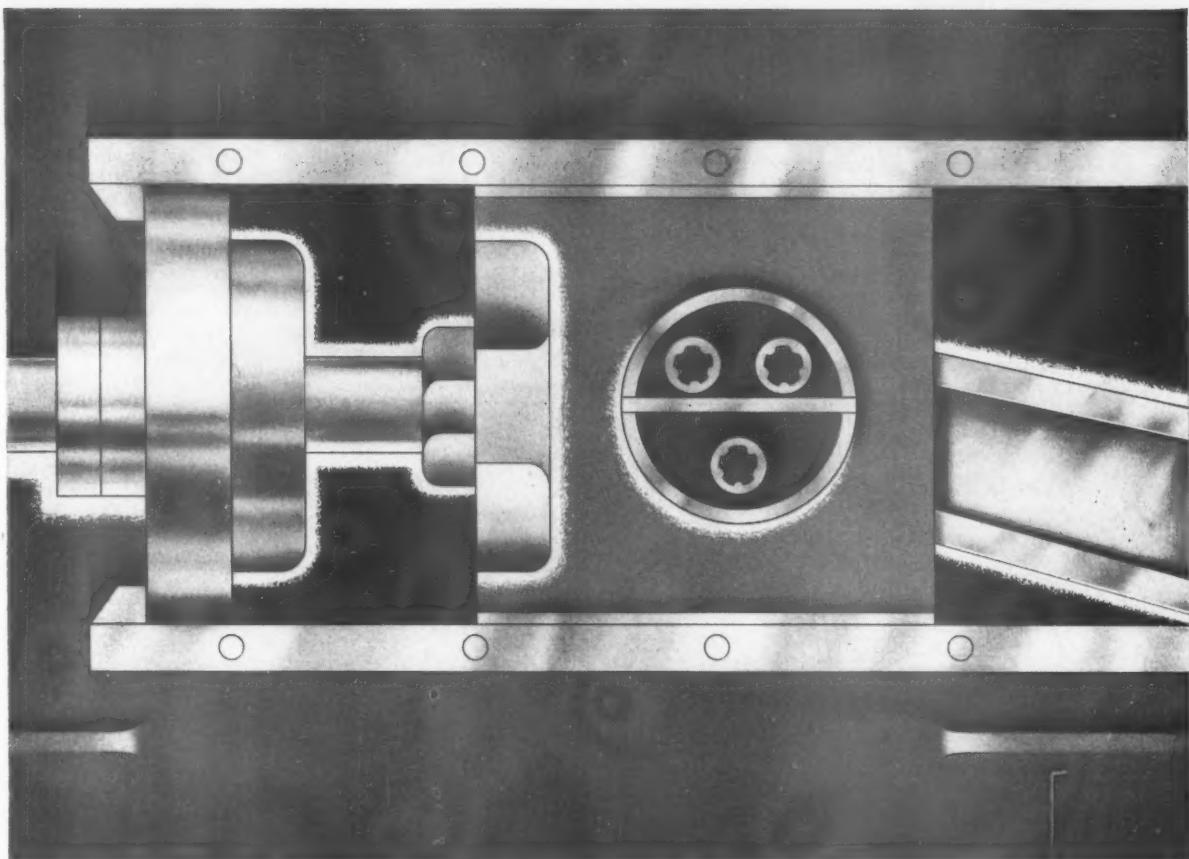
after which Mr. W. T. Forde of the International Business Machine Corp., gave his paper on "Punch & Die Design." A subject of particular interest to Tool Engineers in this area, over 250 of whom were present, and who by their attention and questions following the presentation of paper and slides gave their approval of the value of this meeting. Visiting A.S.T.E. members from Rochester, Newark and Bridgeport were acknowledged and welcomed. (Who were they?)

Plans for the anniversary dinner next month were discussed at the April meeting of **Dayton** Chapter. Chairman Johnson said the meetings committee headed by Harley York, will have a bang up program. Members were urged to bring at least one guest and several volunteered to fill a table. Chairman Johnson gave a report on the meeting of the Board of Directors, but didn't say anything about his other job with A.S.T.E. The technical session was well attended. Mr. Malcolm Judkins, Chief Engineer of the Firthite Div., Firth-Sterling Co. gave an illustrated talk on the manufacturing of sintered carbide tools. A lively and interesting discussion followed with Mr. Judkins answering all questions, and they came at him fast and furious.

Baltimore's April 10th meeting was a delightful affair—good fellowship, speeches, interesting movies all combined to produce one of those Technisocial evenings so typical of A.S.T.E. (Get that, Technisocial). Secretary Steiner gave a graphic description of the Tool Show, which left many regretting that business had kept them from making this trip. Wives and Sweethearts presented a dazzling spectacle at their dance and the male contingent were decidedly dazzle-conscious. Smiling Chancellor O'Connor now has a reserve fund to play with. The Standard Oil Co. of New Jersey presented a motion picture "Design for Power" showing how their gasolines are prepared to meet the requirements of modern transportation. An added attraction was the motion picture "Safari on Wheels," a pictorial record of an expedition through the wilds of Africa. Mr. Donovan of the Hill Chase Steel Co. presented a novelty subject entitled "There's Nothing New Under the Sun," showing some very interesting mechanical contrivances.

An enthusiastic group of Tool Engineers attended the April 13th meeting of the **Detroit** Chapter held at the Fort Shelby Hotel. A turkey dinner and two charming entertainers, who manipulated the piano, accordion and vocal cords kept the gang humming and singing between bites and put everyone in a happy receptive mood. Floyd Eaton, ex-Chairman of the Detroit Chapter and present national Secretary, swore in the new officers who are taking over the reins for the ensuing year. They are: Chairman, Charles Thiede; Vice-Chairman, Kenneth Kuhn; Secre-

(Continued on page 20)



MAKING PRODUCTION DOLLARS S-T-R-E-T-C-H

The simplification or elimination of fabricating processes is one way of making production dollars go farther. Molybdenum steels are often a help in that way.

For instance, a manufacturer of high pressure motor driven pumps uses cast Nickel-Molybdenum steel for cross-head guides because it has the required toughness and hardness. In addition, the ready machinability and close grained structure of the steel make it possible to produce a good bearing surface in the

guide runways by a light cut with a shearing tool. One finishing operation — grinding — is entirely eliminated.

Rechecking your own material specifications may reveal places where Molybdenum steels will produce better results, or lower costs, or both. Our technical book, "Molybdenum in Steel," will be sent free to any interested production executive or engineer who requests it.

PRODUCERS OF FERRO-MOLYBDENUM, CALCIUM MOLYBDATE AND MOLYBDENUM TRIOXIDE

Climax Mo-lyb-den-um Company
500 Fifth Avenue New York City

CHAPTER DOINGS

(Continued from page 18)

tary, Lee Diamond; Treasurer, L. W. Howe. Charlie Thiede, the new boss, appointed the following committee chairmen: Meetings, C. L. Hause; Industrial Relations, F. Hebert; Membership, A. Ketelsen; Reception & Entertainment, G. Whitehouse; Publicity & Editorial, C. Elliott; Standards, J. P. De Montigny; Constitutions and By-Laws, C. Mooney. O. B. Jones, head of the Detroit College of Applied Science was given an honorary life membership in the Society. Mr. Jones, who was the founder of the A.S.T.E. is Society Historian. Joe Siegel made the presentation and concluded by saying, "In a

few words, O. B. this means we think a lot of you and you don't have to pay any more dues." Ford Lamb introduced the A.S.T.E. office force who so capably assisted the officers in putting on the Machine and Tool Progress Exhibition. Much could, but little needs be said about Mr. D. Flater's inspiring talk, "Tool Engineers Must Qualify for Greater Responsibilities" because it will appear in "The Tool Engineer." Mr. Flater is Factory Manager, Chrysler Corporation. Sound pictures of the building of the Golden Gate Bridge concluded a most instructive and entertaining evening.

The April meeting of **Elmira** Chapter was held in Hotel Langwell on the

evening of April 14th. It was a dinner meeting. Mr. H. K. Monroe, Chief Engineer of the Lapointe Machine Tool Co. of Hudson, Mass., addressed the gathering of 75 members and guests on the subject of Developments in Broaching, illustrated by 70 slides. An interesting discussion followed on broaching problems in general. Mr. Monroe was assisted by Mr. K. M. Macomber, Tool Engineer of his company. Joe Owens of Syracuse Chapter was among the visitors. Several applications were received and some very interesting and favorable comments made on the activities of our organization.

Toledo Chapter's annual dinner and installation of officers at the Commodore Perry Hotel, April 4th was a real event. Mr. E. L. Bowsher, superintendent of schools, gave a grand talk on, "Some Trends in Education." He spoke for nearly an hour and no one went to sleep; that proves he is good. M. J. Meyer was a knockout as toastmaster. Chairman Gus Ehrhardt opened the meeting and our esteemed Ford Lamb christened the new officers as follows: Arthur B. Bok, Chairman; Lorence E. Rennell, Vice Chairman; Lloyd A. Kelley, Secretary; Roland H. Mogle, Treasurer. One hundred and forty attended, among whom were Mr. Spicer, Spicer Corp.; Wm. Donkle, President Kent-Owens; E. C. Mogford, Vice President Spicer Mfg. Corp.; B. A. Fay, Vice President Electric Auto-Lite Co., and Charles Pack, Vice President Doehler Die Casting Corp. All the Big Shots, eh what? The society received so many compliments that about 80 new hats, of larger head sizes, had to be purchased. Al, how about your trip to Detroit and return one Friday night?

Philadelphia Chapter held their regular monthly dinner meeting and technical session at Hotel Adelphia on April 13th with seventy members and guests present for dinner and a large group coming in later. Connie Hersam, retiring chairman, opened the meeting with installation of new officers elected at the March 9th meeting. First introducing the new chairman, John A. Strecker and following with Vice Chairman, Paul W. Frankfurter, Sr., who moved up to this job from treasurer; the new treasurer, Al Lovell; Secretary, J. Walter Materne. The meeting was then turned over to John Strecker and a rising vote of thanks given to the retiring officers for the work they did in getting the chapter organized and firmly on its feet in one year. Through the courtesy of the Bell Telephone Company everyone enjoyed interesting sound movies entitled "Broadcasting System" and "Hurricane in New England," which made us all glad we were in Philadelphia in September of last year. The technical session was sponsored by Logansport Machine Inc. Mr. J. C. Cotner, Vice President and General Manager, ably presented an

(Continued on page 22)



BUYING THEM TO WORK COSTS LESS THAN MAKING THEM WORK

The die maker wants to know that when punch and die are mounted in the Die Set the die will close smoothly and accurately. Making them work means lost hours, lost dollars in correcting, trying and fitting. So he includes Danly Die Sets in his estimates.

The die user wants to know that the die will produce accurately in his production line at scheduled rate.

Making them work costs money, for every set-up, for every production run. So he likes to see "Danly Die Sets" in an estimate.



DIE BUYERS—Specify Danly Die Sets for Your Dies
DIE MAKERS—Include Danly Die Sets in Your Estimates
It will be good business for you both

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LONG ISLAND CITY, N. Y.	DETROIT, MICHIGAN	CLEVELAND, OHIO	DAYTON, OHIO
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DANLY DIE SETS and DIE MAKERS' SUPPLIES

Their Dependable Quality Means Lower Cost Stampings

AS *Quick* AS YOU CAN SAY, "STARRETT HACKSAWS"



If it's more and faster cuts you want, get them with Starrett Hacksaws. The *complete* line of Starrett S-M Molybdenum, High Speed Steel and Tungsten Alloy Hacksaws includes the one best blade for any metal cutting job.

FOR BETTER CUTTING, pick the correct hacksaw blade from the complete line listed in the Starrett Catalog. Starrett Hacksaws are readily available through your regular distributor. Write for Starrett Catalog No. 26 T.



THE L. S. STARRETT CO., ATHOL, MASS., U. S. A.

World's Greatest Toolmakers — Manufacturers of Hacksaws Unexcelled — Steel Tapes, Standard for Accuracy — Dial Indicators for Every Requirement

Standardize on

STARRETT TOOLS

BUY THROUGH YOUR DISTRIBUTOR

CHAPTER DOINGS

(Continued from page 20)

interesting and instructive talk on hydraulic applications. During the business meeting that followed, the Spring Garden Institute, in Philadelphia, had asked the chapter to sponsor and organize a course in tool and die design and Ned Glenn, Chairman of the Educational Committee will take immediate steps to organize an efficient course to start next fall.

Approximately 175 members and guests attended the March meeting of the **Cleveland** Chapter. About 125 showed up for dinner while the rest came later for the installation of offi-

cers and to hear an excellent illustrated talk on hydraulics by J. C. Cotner, Vice President and Chief Engineer of Logansport Machine Co. Inc. After the meeting members and guests had an opportunity to see several pieces of equipment in operation along with many cut away samples of valves, cylinders and accessories. Thanks to Mr. Whittel for the use of an air compressor used to operate the equipment. Jack Hawkey came disguised as Dr. Fulla Hooey of the Shanghai Iron Works to give the boys a few high-lights on Tool Engineering in China. They finally had to call in the police to pull off the whiskers before installing him as chairman. The boys from Can-

ton, Youngstown, Warren and Alliance, certainly set an example for those right in town who didn't show up. Congratulations to Ray Haserodt on a fine article on dies. He's really some scribe. The following committee chairmen will handle all items under their control: Advisory Committee, Geo. A. Smart; Constitution and By-Laws, Frank Davis; Editorial, R. B. Oswell; Entertainment, John R. Fitzsimmons; Industrial Relations, J. J. Frederkiel; Methods, F. W. Denning; Meetings, Gus Sealander; Membership, T. J. Fraser (I remember, Tom, way back when); Standards, R. E. Harrold; Publicity, Wm. T. Reiff Jr.

One of the largest audiences of the season came out to Newark, N. J., on April 11th to hear Mario Martellotti, research engineer, Cincinnati Milling Machine Co. give a talk on the "Physics of Metal Cutting" before the **New York-New Jersey** Chapter. The large number of questions that were asked the speaker after his formal talk indicated the keen interest by local Tool Engineers in the formation and function of the built-up edge in the cutting of metal by tools. Mr. Martellotti's talk was in the form of a lecture originally given by Hans Ernst, director of research of Cincinnati Milling.

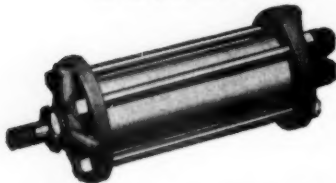
The monthly dinner lecture meeting of **St. Louis** Chapter was held Thursday evening April 6th at the York Hotel with about 85 present. The speaker for the evening was Millard Romaine, General Sales Manager, Cincinnati Milling Machine Company, who spoke on "Surface Grinding." After the dinner, Chairman Doogan introduced the other officers, Vice Chairman, Harry Linders; Treasurer, C. M. Andrews; Secretary, Herbert Tomasek. A. Hollmann is the new Chairman of the Program Committee. St. Louis is already looking forward to their picnic in July. (What do you mean—stay sober and have a good time?) St. Louis plans to double their membership this year. That's a big order, boys, but it CAN be done.

Syracuse Engineers held their April meeting at the Syracuse Industrial Club. It was a dinner meeting and about 42 came out for the dinner and 112 attended the lecture. (There must be some good cooks down in Syracuse.) The speaker of the evening was K. C. Monroe, Chief Engineer, Lapointe Machine Tool Company of Hudson, Mass. who spoke on "Broaching." Ford Lamb also proved his ability as an after dinner orator. The following officers were administered the oath of office by Ford: A. H. Mitchell, Chairman; Thomas McMichan, Vice Chairman; F. C. Savage, Treasurer; W. E. Parrish, Secretary. Syracuse Chapter also extended a hearty welcome to H. H. Root, formerly with Detroit Chapter No. 1 and E. J. Floring recently with Buffalo Chapter No. 10. Altho gaining two new members, Syracuse regrets the

(Continued on page 26)



NOPAK Cylinder Head with built-in, non-adjustable air cushion. Adjustable head can be furnished on one end only, if desired.



NOPAK Cushioned Air Cylinder with Pendulum Mounting. All standard mountings available.

AIR CUSHIONS

in All NOPAK Air Cylinders Eliminate Costly Metal-to-Metal Impact

... what's more, the new type, NOPAK Air Cylinders, with Non-adjustable, pneumatic cushion-stop, sell in the same price range as non-cushioned cylinders!

Now, instead of choosing between cushioned and non-cushioned cylinders, you choose between adjustable and non-adjustable cushion heads. Whichever you specify, you are sure of relief from noisy, wearing, piston-hammering, longer life for pistons, and cup-leathers, lower maintenance costs, and smoother, more efficient performance.

Both types of NOPAK Cushioned Air Cylinders have Special Composition Cup Packing and extra-wide piston bearing to protect cups from excessive wear and friction. Write for New Illustrated Bulletin.

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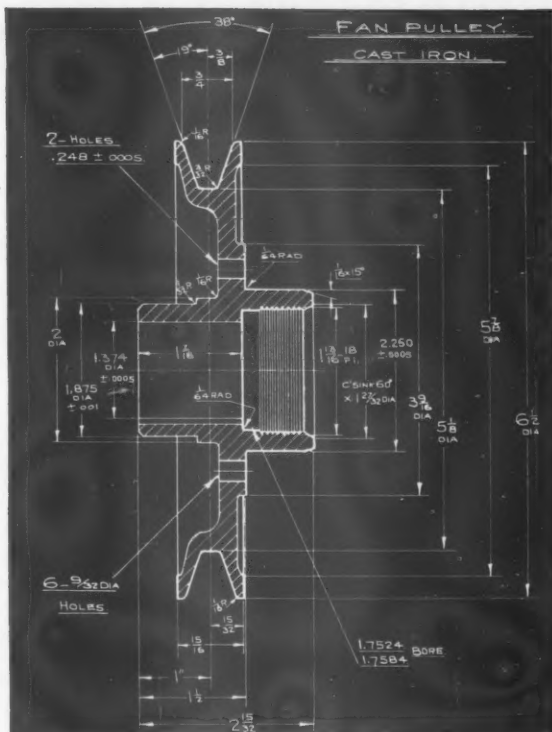
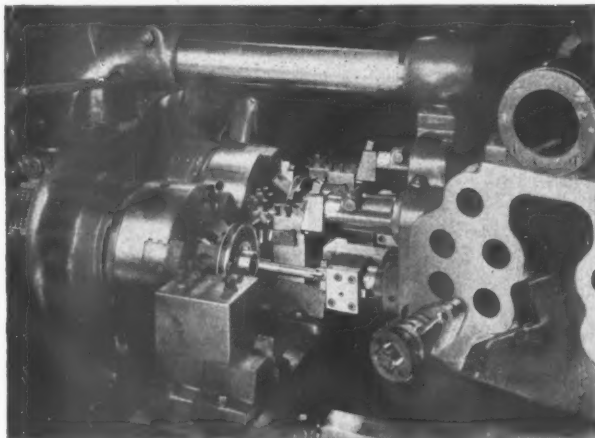
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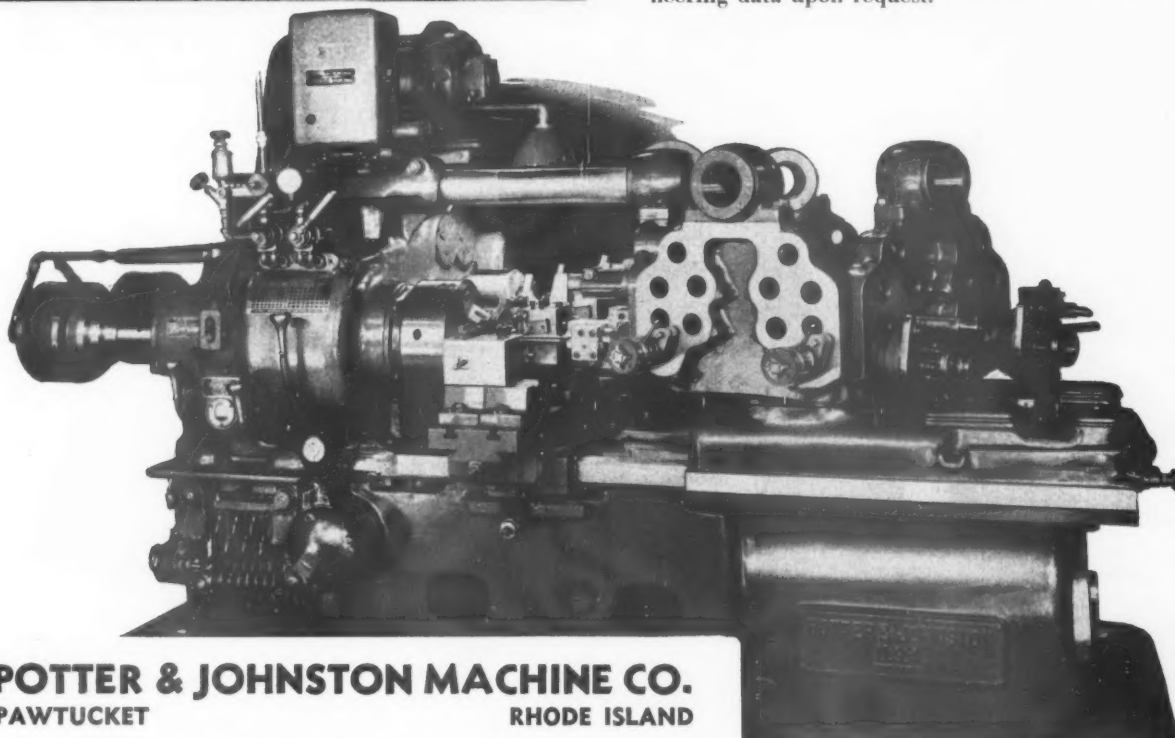
VALVES and CYLINDERS

Fan Pulleys Machined on P&J 5-D-2 Two Spindle Power-Flex Automatic

Besides completely machining this job, the P & J Automatic finishes the drilling of 8 holes and the main bore threading at one chucking. The drills are guided in hardened ground bushings. The driving lug engages with a driver set between the chuck jaws, causing the head to revolve with the work. As the drill spindles are carried around a fixed pinion which drives the drills, the turret moves forward to complete the 8 holes. One man can easily handle two of these machine units.



For new versatility and greatest possible economy, consider the P & J Automatic Chucking and Turning Machines. Literature and engineering data upon request.



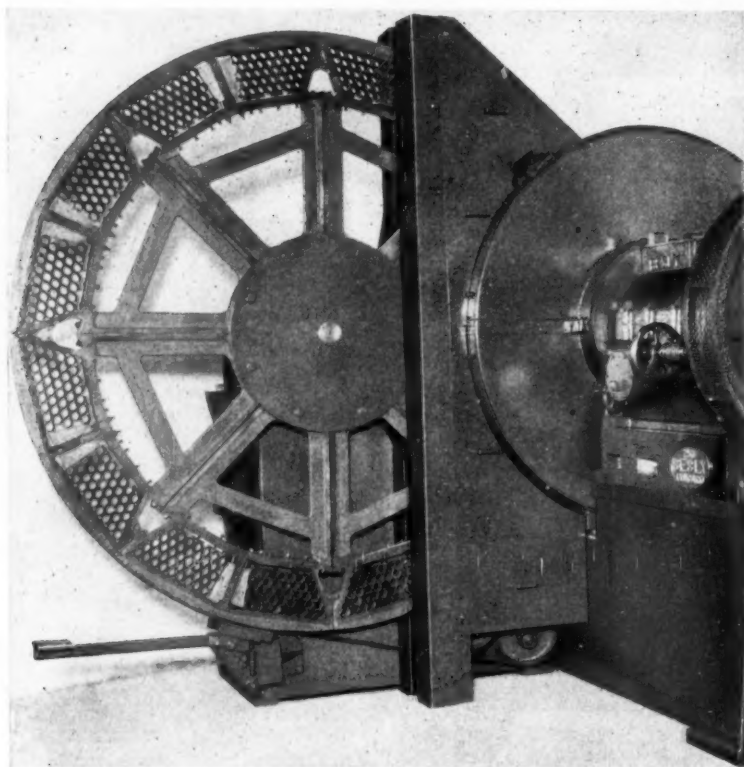
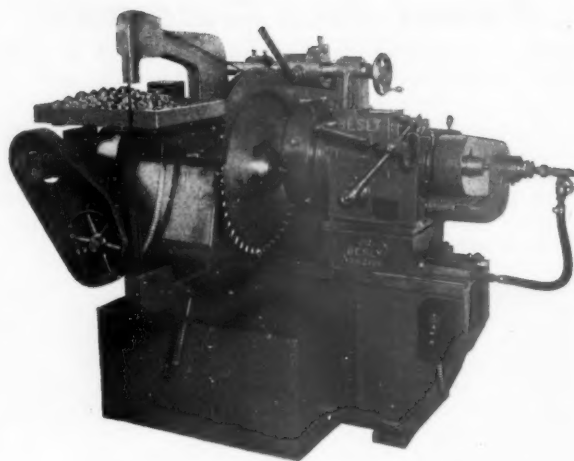
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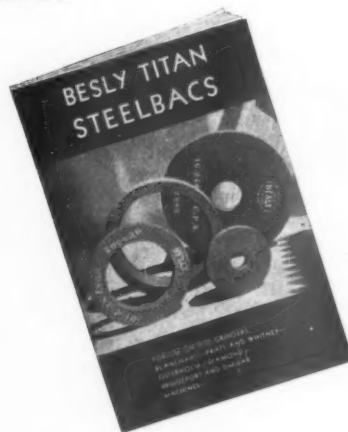
Ontario; Arthur Jackson Machine Tool Company, 437 Grosvenor Avenue, Montreal, Canada; Burton Griffiths & Co., Ltd., Birmingham, England; R. S. Stokvis et Fils, Paris, France; R. S. Stokvis & Zonen, Rotterdam, Holland; R. S. Stokvis et Fils, Brussels, Belgium; Maskinaktiebolaget Karlebo, Stockholm 1, Sweden; Ing. Ercole Vaghi, Milano, Italy; Yamatake & Co., Ltd., Tokyo, Japan; (Imperial Export Company, 44 Whitehall Street, New York) N. Y.; Almacoa, Zurich, Switzerland; Be-Te-Ha, Warschau, Poland; Schuchardt es Schutte, Budapest, Hungary.

BESLY BUILDS THEM...

from the smallest to the largest. Double Spindle Disc Grinders with grinding members from 12" to 72" diameter. With Rotary Feed, Hydraulic Travelling Table, Roll Feed, Power Oscillating Fixture, Hand Operated Swinging Fixture and various other devices for feeding work. Always equipped with Besly Titan Steelbacks, the Resinoid Bonded Bolted-On Abrasive Members, 1", 2" or 3" thick. • These machines are unequalled for production grinding of—coil springs, piston rings, piston pins, carbon brushes, thrust washers, bushings, nuts, wrenches, pliers and similar parts. If you want to finish two opposed surfaces simultaneously, consider the Double Spindle Besly Grinder.



• Send samples, drawings or sketches and let Besly Engineers give you the benefit of their forty years' experience with this type of equipment.



[[Write for your copy of Booklet
on Besly Titan Steelbacks.]]

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CHICAGO, ILLINOIS

A detailed black and white photograph of a vintage metal lathe, likely a Bridgeport model. The machine is shown from a side-on perspective, highlighting its various components. On the left is the headstock, which houses the main spindle and has a label that reads "BRIDGEPORT". Below the headstock is a large, dark-colored base with two prominent, vertically-slatted ventilation grilles. The central part of the machine is the bed, which supports the ways. A large, spoked handwheel is visible on the front of the bed. To the right of the headstock is the tailstock, which can be moved along the bed. Further right is the tool post, which holds the cutting tool. The machine is set against a dark, textured background.

Job No. 2 (Above)

TURN FROM TEMPLATE

Material—SAE-1035.

Peripheral Speed—feet per minute 327.

Feed—.017". Bulletin No. 182 fully explains the **AUTOMATIC SIZING** controls on

Time per cut—3.43 minutes.

*Set-Up time—3 minutes or less.

Job No. 1 (Below)

Material—SAE-1035.

Speed—feet per minute 300.

Feed—.017".

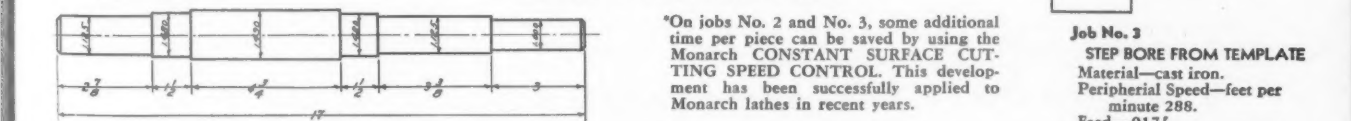
Tolerance on diameters and length $\pm .002^*$


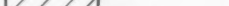
Total machining time both ends of Shaft—

2½ minutes.

Total Set-Up time for diameters and lengths

—10 minutes or less.



 **AUTOMATIC SIZING** controls convert any size Monarch lathe into an *automatic* machine suitable for automatic production of large or small quantity lots. 

The jobs shown on this page are done in small lots on Monarch Standard Lathes equipped with **(AUTOMATIC SIZING)** Controls. One operator easily attends two or more lathes because the machining cycle is automatic.

Monarch **AUTOMATIC SIZING** Controls can readily be applied to any size of Monarch engine lathe, or tool room lathe . . . to help you "MAKE MORE THINGS FOR MORE PEOPLE AT FAR LESS COST."

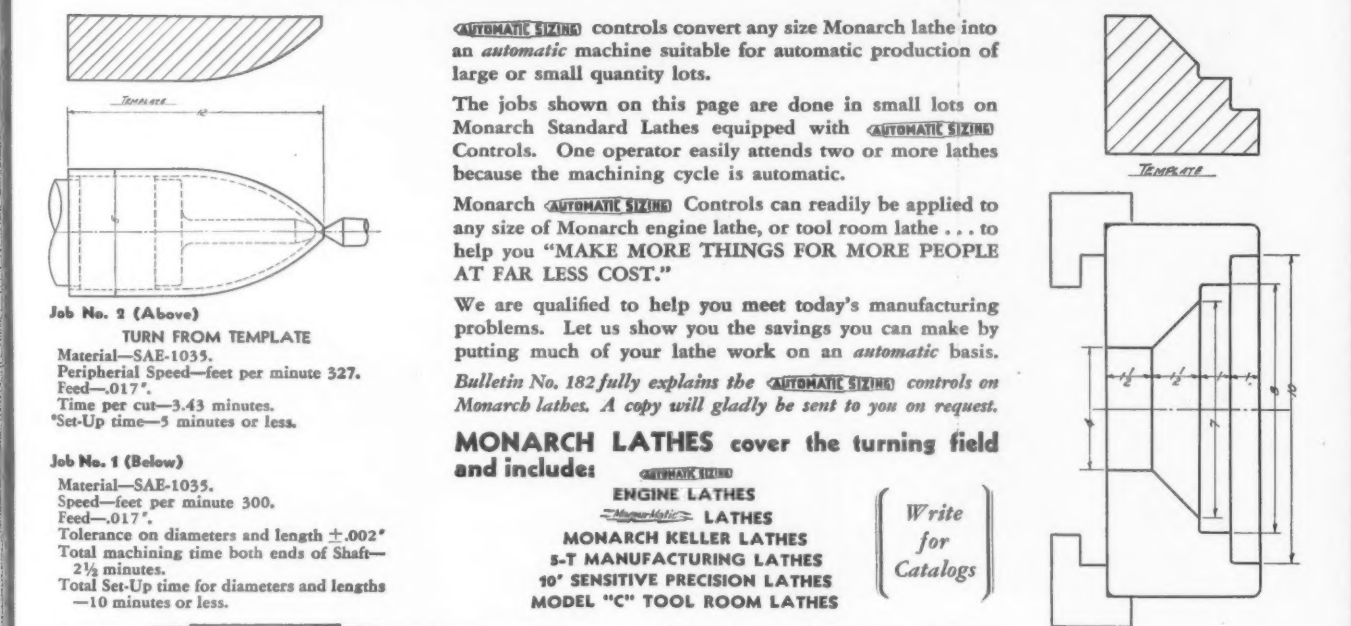
Job No. 2 (Above)
TURN FROM TEMPLATE
Material—SAE-1035.

Peripheral Speed—feet per minute 327.
Feed—.017".
Time per cut—3.43 minutes.

MONARCH LATHES cover the turning field
and include: Automatic (1100)

Material—SAE-1035.
Speed—feet per minute 300.
Feed—.017".
Tolerance on diameters and length $\pm .002$ ".
Total machining time both ends of Shaft—
2½ minutes.
Total Set-Up time for diameters and lengths
—10 minutes or less.

Material—SAE-1035.
Speed—feet per minute 300.
Feed—.017".
Tolerance on diameters and length $\pm .002$ "
Total machining time both ends of Shaft—
2½ minutes.
Total Set-Up time for diameters and lengths



On jobs No. 2 and No. 3, some additional

time per piece can be saved by using the Monarch CONSTANT SURFACE CUT.

CASTING SPEED CONTROL. This develop-

LINE SPEED CONTROLS

Peripheral Speed—feet per

Monarch lathes in recent years.

THE MONARCH MACHINE TOOL CO. Sidney, Ohio, U. S. A. Time per cut—3½ minutes.

THE MONARCH MACHINE TOOL CO., Sidney, Ohio, U. S. A.

MONARCH LATHES
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CHAPTER DOINGS

(Continued from page 22)

loss of Martin Ness to Rochester Chapter, Fred Cooper to Buffalo Chapter and Bert Banks to Elmira Chapter.

Rochester Chapter met at the Leiderkrantz Club April 4th. This was a business meeting and was called to order by Chairman Charles Codd. Mr. Bartek made a motion that was seconded and carried to have their new gavel engraved with the date the chapter was organized and the names of past Chairmen. C. E. Lucas explained arrangements for a bowling party at the Eagles Club April 28th.

Cincinnati Chapter held their April 4th meeting in the conference room of the Cincinnati Milling Machine Company, where they heard an interesting and instructive illustrated talk by Millard Romaine, Sales Manager, Cincinnati Milling Machine Company on "Surface Grinding." At this meeting it was announced that Cincinnati Chapter had inaugurated Educational meetings to be held on the 3rd Tuesday of each month. The first meeting of this type will be held on April 18th and the subject to be discussed by Dr. Max Kronenberg will be "Cutting with Single Point Tools."

Buffalo Chapter held a business meeting on March 27th at the Hotel Buffalo. Their new chairman, Otto Winter presided. They voted to change the name of their chapter from Buffalo Chapter to Buffalo and Niagara Frontier Chapter as their chapter takes in a large territory. Ford Lamb was with us for the evening and gave one of his inspiring talks. The meeting closed at 11 p. m. after which we all enjoyed FREE beer and FREE lunch. The April meeting for Buffalo Chapter held at the Riviera Restaurant was attended by 60 members for dinner and 30 more for the technical session. Chairman Otto Winter, briefly reviewed the Detroit Tool Show, the Society's financial position and Buffalo's chances for the 1941 National meeting and Tool Show. George Remensnyder and Ray Fitch will be opposing Captains of ten (5 man) teams in a drive for members, the losers to sponsor a party for the winners. Your editor introduced the speaker for the evening, R. H. Rogers of General Electric Company, Schenectady, N. Y. who spoke and explained by words and slides the many contributions the Electrical Engineers have made for minute control and safety in many manufacturing problems. Mr. Rogers answered many questions and received a nice hand for his efforts.

Bridgeport Chapter held a dinner meeting at Mary Journey's Inn April 13th. Their new officers are: Chairman, Ben Page; Vice Chairman, Charlie Speakman; Secretary, Hugh DeAngelis; Treasurer, Harold Carter. One of their members, L. Heres de Wyk gave a talk on hot and cold forging of metals.

Pittsburgh's April meeting was presided over by their new Chairman, J. P. Wiley. G. P. Longabaugh, Chairman of the membership committee announced 49 new applications this year. Gardner Young, Treasurer, reported they had money in the bank and Wm. Owens announced the complete program for the year. Some chairman—eh? Mr. M. R. Kavonagh, General Manager of Oliver Iron and Steel, Mr. F. F. Vernon, Shop Supt. of Gulf Research and Mr. W. B. Kennedy, Metallurgist of the National Tube Co. were guests. An interesting paper on modern High Speed Steel was presented by the Chief Metallurgist of the Vanadium Alloy Steel Co., Mr. J. P. Gill. The J. R. Weaver Testimonial Dinner will be held on May 12th at the Metropolitan Club in the Keystone Hotel in place of the May meeting.

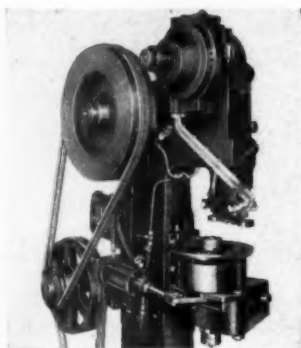
Rockford Chapter had another bang-up meeting at the Faust Hotel on April 13th. The meeting progressed in fine order and enthusiasm ran high as the guests studied the 20 exhibits that demonstrated their ware before dinner, at intermission and after the lecture. During the dinner the guests were entertained by the same floor show which made such a grand hit at their St. Patrick's dance. The newly elected officers for the coming year were installed

(Continued on page 32)

the RIVITOR

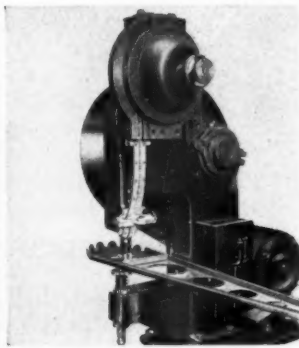
already serves these industries

AUTOMOTIVE.



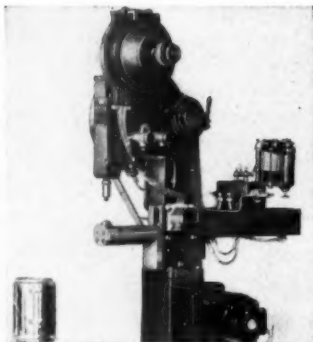
The Rivitor is shown here setting two solid rivets at a time to attach cushion springs to driven clutch plate assemblies.

AIRCRAFT...



This is the standard "BR" Bench Type Rivitor tool for setting $\frac{1}{8}$ " diameter x $\frac{1}{4}$ " long duralumin rivets in airplane sections.

UTENSIL...



The Rivitor is shown here setting aluminum rivets to attach handle brackets to bodies of percolators.

CONTAINER...



This Rivitor sets two rivets at the same time to attach handle brackets to paint pails.

The Rivitor ably handles not only these jobs in these industries, but many jobs in these and other industries, wherever there are solid rivets to be automatically fed and set to obtain a stronger joint—better—faster.

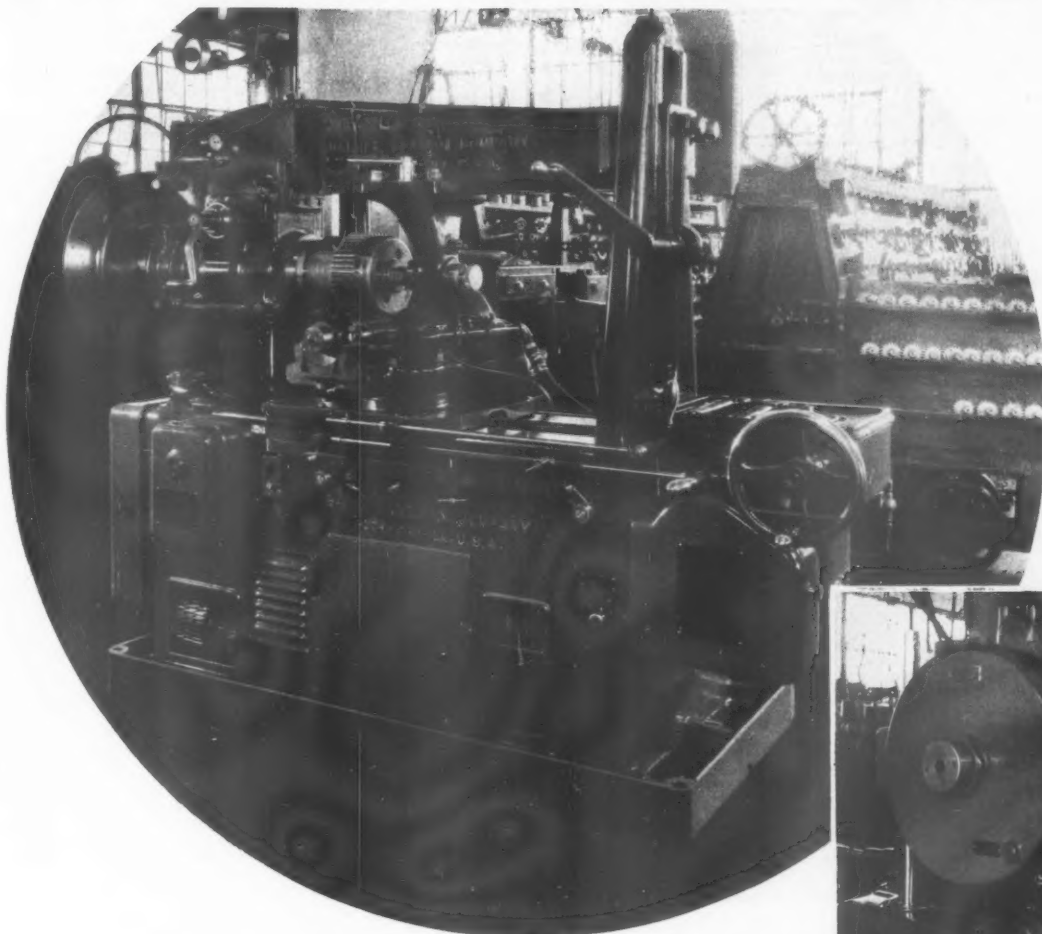
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Agents in principal cities in United States
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Send for our new Bulletin R-1A. This will give you more information on the Rivitor in these industries.



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Heavy duty Hob Slide and Work Slide, with extra large index wheel, did the trick.



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Material, production, and specially accurate indexing all combined to make a tough job out of hobbing mainshaft transmission gears . . . 5-6 pitch, 47 teeth, loaded two at a time, back to back for a total face of slightly more than 3". A Type A Hobbing Machine with extra heavy slides took care of the exceptionally heavy work. A touch of Barber-Colman Engineering in the application of an extra large and accurate drive to the work-spindle mastered the remainder of this tough job. Write for the figures, and complete information on this machine.

For bigger and tougher work, Type D. For smaller work, several sizes down to Type S. For all hobbing . . . Barber-Colman Hobs, and Engineering Service. Investigate.

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MILWAUKEE, WISCONSIN
Dumser & Schroeder
610 West Michigan St.

Handy Andy Says —



*There was a mechanic, a wise young guy,
No car could he borrow, no car could he
buy.*

*So he took four spools and an old tin can,
Called it a Ford and the *thing ran.*

You may recall some of the thousand and one wheezes that went the rounds in the early days of the Model T, some ribald, all funny but highly

complimentary to the staying qualities of a "rattling good car." It got you there, and back, which was something to brag about in the infancy of the auto industry. Henry Ford, however, visualized cheap and dependable transportation for the masses, and like the proverbial postage stamp, stuck to one thing until he got there. By the time he "arrived" he had laid the foundation for an industrial empire.

Now, I have never worked for the Ford Motor Company (hitherto, I have mentioned advertisers who are, incidentally, past employers) but I have admired Ford management for its tenacity of purpose, its unswerving de-

votion to a principle. Like Old Man River, it just "goes rolling along." Ford standards, especially as regards tools and materials, have always been high; it just happens that in the early days precision had its ultimate in the tenth, the usual close tolerance plus or minus a thousandth. Today, automatic inspection machines select or reject parts to a tenth of that. When Carl E. Johansson raised precision to millionths Henry Ford acquired American rights of the "Jo Blocks," went into the gage business, the move putting Ford Motor Co. among our advertisers. A wise toolmaker, you know, advertises his wares; to paraphrase, eternal advertising is the price of sales. That, by the way, goes for Tool Engineers too; the whole world knows about us because we advertise—and back it with accomplishment.

Echoes from the Tool Show still reverberate, and so far, enthusiasm runs high; personally, haven't heard a complaint from an exhibitor, of whom I have seen plenty. Naturally, "The Tool Engineer" booth was a focal point for the gathering of the clan during the Show, and many were the acquaintances that were renewed there. K. T. Keller met a buddy from "way back," and Jim Weaver reminisced with a crony whom he hadn't seen in seventeen years. These are highlights; if all the handshaking that took place at the Show had been converted to productive work the pumping would have dried the Great Lakes. Then how could we have taken a steamboat to Cleveland? Gosh!

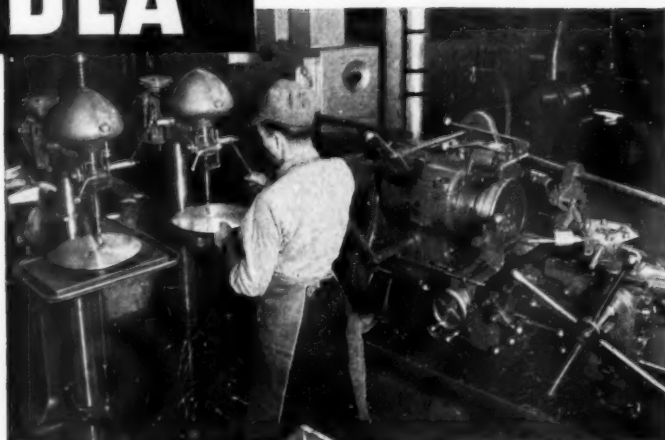
Had a letter from Slim McClellan, tuneful Leader of the Pack, Order of Hounds. He asks that I put in a word to the Wise (All right, Georgel shoot, if you must, this old bald head, but spare your country's flag. March on!) so we'll have a big gathering in Cleveland next fall. The welkin should ring with the baying of the pack, so send in your applications; we're really good and want live members. A free "pooch," lapel size, will be given all applicants who remit a bone with application. Owwowuuuuw!

One of our boys showed me a letter from the big shot of his home office (located by the way, where the luscious clams wait a welcome to the gourmet) who wants to know who "this duck is who stirs up old memories"—or words to that effect. Gosh! one would think that I am one of the patriarchs! Rather than have that impression spread, I'll make a confession. The truth is that when I was about eleven my stepfather (a really fine man, rest his soul) tanned my bottom just once too often, so to break a painful habit I ran away and "took me a yob" in a cotton mill. But even in those halcyon days the bosses had some qualms about robbing the cradle, so I passed off for sixteen, having grown faster in the first decade

(Continued on page 30)

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To Show Your Boss



Does your boss know that Delta Drill Presses are the finest labor-saving machines you can have in your shop? He will appreciate it if you show him how—in addition to handling their regular jobs of production drilling and tapping—these low-cost Drill Presses can be used to get additional operations at no direct labor cost! Delta Drill Presses are portable and self-contained. They may be placed alongside other machines, such as a milling machine, so that the milling machine operator can operate the Drill Press during the cutting period of the milling cycle. In this way, labor costs

on many operations can be entirely eliminated! This is but one of the many applications whereby Delta low-cost tools bring extra profits. Want to know more? Let us send you complete information today. Just send the coupon.

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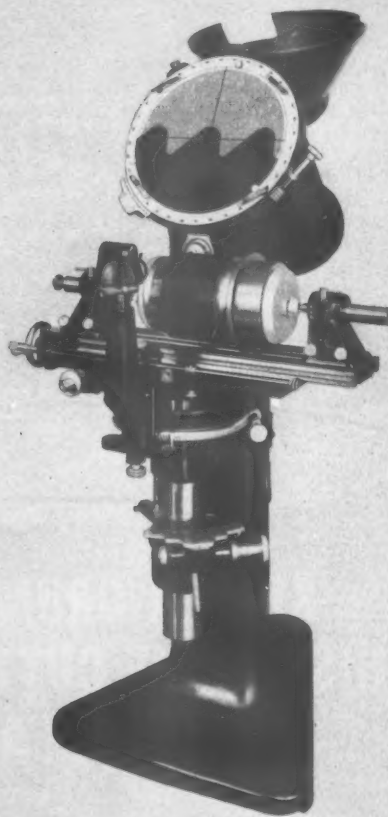
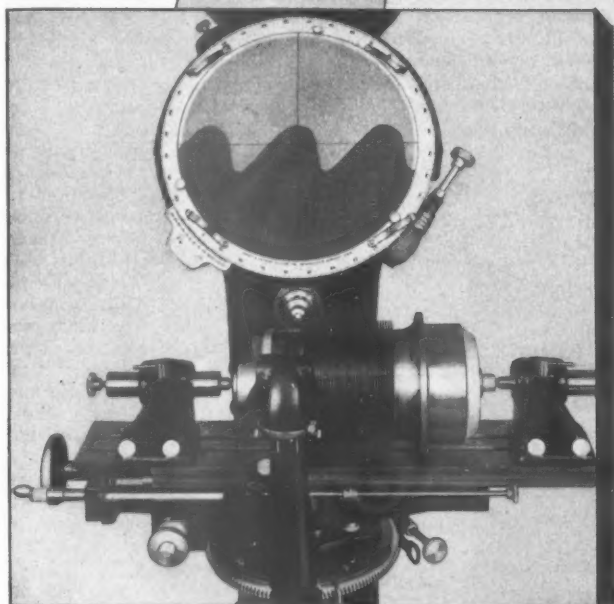
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CHECKING parts for airplane engines on the J&L Optical Comparator has become standard practice in most of the leading aircraft plants of the world.

Inspecting buttress threads — the life thread between cylinders and crankcase — is accomplished with ease on the Comparator. The cylinder is mounted on an arbor which is held between centers on the work table. A beam of light passes over the threads. The shadow of the buttress form is magnified by a lens system and is then reflected by a mirror onto the chart glass in full view of the inspector. Any deviation may be detected at a glance as the shadow is compared with the master chart on the chart glass — any error in angle may be measured on the vernier plate within 5 minutes of arc. Errors in height or depth, lead or spacing, may be measured to .0001".

The J&L Comparator gives proof to the accuracy of machining operations.



A 24-page catalogue, giving complete details of the line of J&L Comparators will be sent on request.

Jones & Lamson Machine Company
SPRINGFIELD, VERMONT, U. S. A.



HANDY ANDY SAYS

(Continued from page 28)

of life than the second. At thirteen was apprenticed as machinist, at sixteen (alias 21) a journeyman, but demme if I could raise a mustache to look the extra five years. I've never cheated the other way, having found that the man "over 40" still sits the saddle. Our problem now is to provide jobs for our young fellows. We'll work together on that, eh?

Relieved of previous duties, found time to attend last Detroit Chapter meeting, and for the benefit of the boys North East West South would say

that the movie of the erection of the Golden Gate Bridge is an education and an inspiration, should be shown at every Chapter to a capacity crowd. Don Flater, Chrysler executive whose recent articles in "The Tool Engineer" have provoked considerable thought, was speaker of the evening, challenged one or two of our editorials in the course of his talk. Among other things, that the technical worker is an "expense man," Mr. Flater contending that designers of tools are eagerly sought by management, are in nowise considered expense men. In present tense that is true, but it must be remembered that we have been engaged in a consistent campaign to educate manage-

ment to an acceptance of fundamental truths regarding the value of Tool Engineers. The idea is beginning to take root; Mr. Flater, himself a manager, supports my contention that Tool Engineers are the Key Men of Industry.

I challenge, with reservations but without heat, the speaker's statement that the greatest thing in life is the satisfaction of a job well done. That state is secondary to the greater satisfaction of recognition of a job well done. Mr. Flater, a successful man, epitomizes that premise; his employers attest to it, else they would not so consistently advertise the fine cars they make. They know that they've done a good job, but unless that knowledge is broadcast through advertising theirs will be but a local market. To the Tool Engineer—or any trained man—recognition means not only credit for accomplishment but, as long as the dollar is a badge of success, there must also be commensurate reward. That is an issue which we do not choose to force; we can, however, advance the basic truth that industrial progress is largely committed to the brains and hands of the Tool Engineers. It works both ways; the Tool Engineer must deliver the goods, even to the extent of keeping a few jumps ahead of the paymaster. Management and engineers, united we stand, divided—we lag in the march of progress.

Sometimes I wonder what it's all about. An ad in a local paper calls for a colloid chemist, Salary \$300, requirements (among other things) being a Ph.D. degree. Four years high school, four at college, three in P. G., plus industrial training—say about eleven years advanced education and a few more of practical training; rather a meager reward for years of sacrifice and debt. Yet, even though he lack a college degree, the Tool Engineer's training is as intensive, as arduous as that of the lawyer and the doctor, and his must be an intelligence equally quick and keen, keener if anything since he deals with inarticulate things. Law is phrased to confuse, while the human machine is already created, quite standardized. But the TOOL is still embryonic, the T. E. acting in the multiple capacity of father, nurse, doctor and, sometimes, undertaker, the place of interment being the scrap pile. "The doctor buries his mistakes; the Tool Engineer's bull is a monument forever." Yet, the Tool Engineer whose work enhances the pleasures and conveniences of life is as essential to the scheme of modern society as the doctor who, at the best, can but prolong life.

It was a pleasure, at the Detroit meeting, to witness a gesture long deferred, but oh, so utterly appropriate. I mean the bestowal of honorary membership to O. B. Jones, President of Detroit College of Applied Science and, be it im-

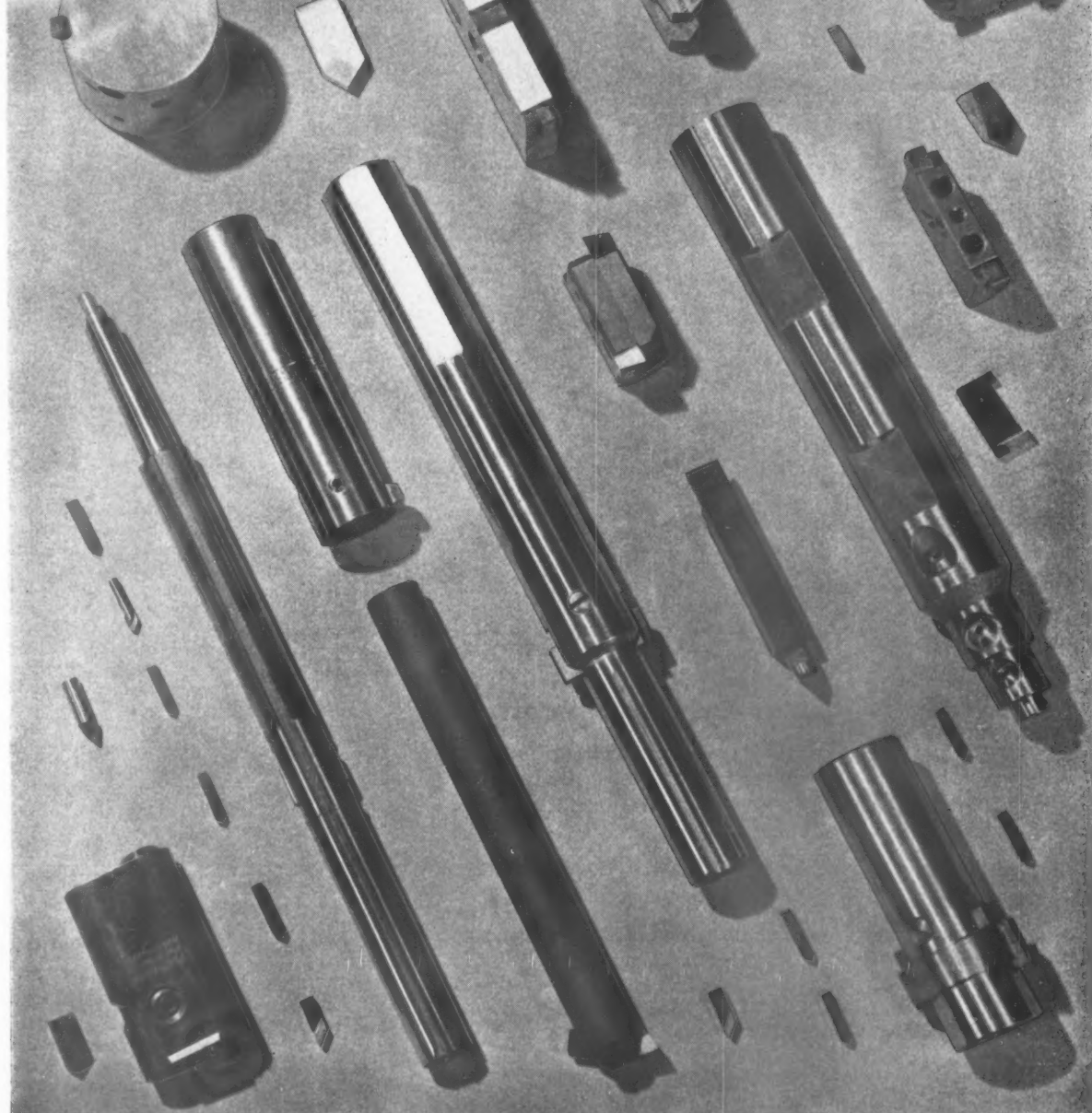
(Continued on page 45)



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CHAPTER DOINGS

(Continued from page 26)

after the dinner. They are as follows: Chairman, Geo. Johnson; Vice Chairmen, Kenneth Lund, Henry F. Ruehl, Fred Kempmeier; Secretary, R. E. Meili and Treasurer Harry Caldwell. 140 members and guests attended the dinner and over 350 the technical session. The meeting was conducted by E. W. Dickett, retiring Chairman, and turned over to George Johnson, the new Chairman, after he was installed. The last of the guests left at 11 P. M. All in all a mighty fine meeting.

Schenectady Chapter held their April 6th meeting in Rice Hall of General Electric Company. Mr. A. M. Swiger

of the Chrysler Corporation gave an interesting talk on "Superfinishing." A large group of 250 were present among which were representatives from the Engineering, Drafting and Wage Rate and Planning Groups from the G. E. Co. There were also delegates from the Gurley Instrument Co. at Troy and the American Locomotive at Schenectady. Harry Crump, newly appointed chairman of the entertainment committee gave an outline of the future meetings and it sure looks like a big year ahead for Schenectady.

Well along comes **Cleveland** with the report on their April meeting. Glad to hear from you and you just bet you're not too late. **Cleveland** Chapter,

75 strong, held their April meeting on the 13th. No technical session was held as it was a meeting to introduce all committee chairmen and their staffs to all the members. After hearing from all committee chairmen, it looks like a big year ahead. Russ Oswell had to draft his committee for the Editorial work but Fitz was swamped and could have had the whole gang after he mentioned that even the entertainers sometime had to be entertained. Walt Wyall is sure to be at the next dinner because he won the free ticket, but why not do the right thing, Walt, and bring a guest along on the FREE ticket?

Milwaukee chapter's April 13th meeting was well attended by members and guests. Mr. H. J. Stagg, Crucible Steel Company of America, spoke on "Tool Steel as Related to Tools." This was accompanied by the film "Steel and Tools."

Art Johnson, who of late has been making it a habit to win this chapter's door prize, also has the boys guessing as to what type of charm piece he carries. Eldred Rutzen rather suspects it to be a tool steel "bunny paw," and should he wrest a confirmation from Art, will consider market and production possibilities for said charm. (If it really works send one to your Editor, I can use it.)

Central Penna. York Chapter No. 22 held a meeting and plant visitation at the Grantley Plant of the York Ice Machinery Corporation, York, Pa. on April 11, 1939. About 40 hardy individuals braved a torrent of rain to attend the meeting. In the absence of the chairman the vice-chairman, Horace Wiest conducted the meeting. Henry Bentzel, Supervisor of the Methods Department of the York Ice Machinery Corporation outlined the development of the finned coils manufactured by the firm. After this talk the group made a tour of the Copper Coil Department and was shown the latest equipment and set-up for the production of coils. The visitors exhibited a keen interest in the entire set-up. The success of this visitation merits another in the near future.

A full list of committees has been announced and preparations for the 1939-40 season are now going forward. Membership applications are being received at a steady rate which is encouraging to the officers and committees.

PIERCING WITHOUT PRESSES

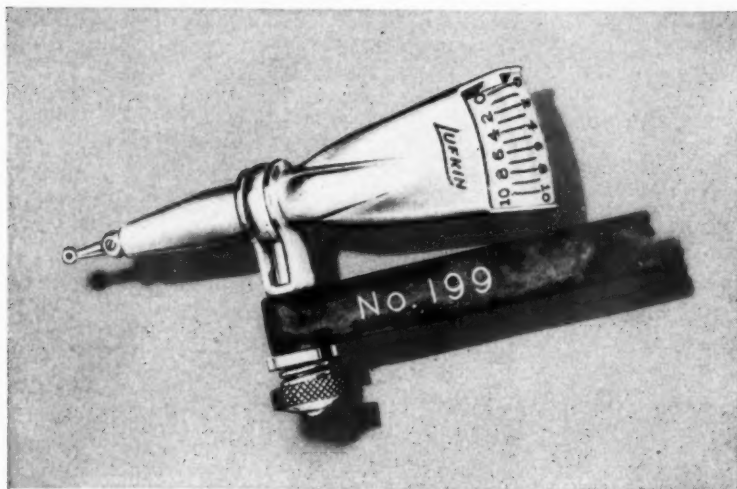
(Continued from page 15)

held while the operation is performed, is located at a conveniently height for the operator and as can be seen from the illustration, is tipped backwards slightly so that the pierce will naturally locate itself in the correct position. All clamps are hydraulically operated and powered from the same unit that supplies power for piercing and forming the holes.

Taken as a whole, it is apparent that the variety of applications to which this equipment can be put is practically unlimited.

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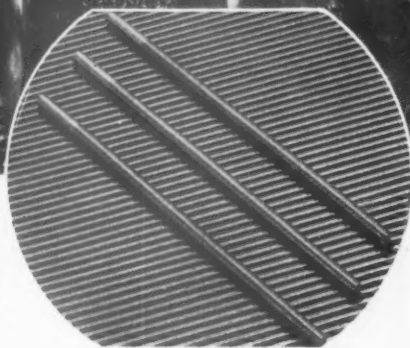
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TAPES — RULES — PRECISION TOOLS



Off

★ These screws of cold rolled bar stock are threaded a distance of $19\frac{1}{4}$ " cut off, chamfered, knurled at one end and a number 0 hole is drilled $\frac{1}{8}$ " deep. The two operations require 1 minute and 40 seconds and 1 minute and 30 seconds respectively.



COMES 47% OF MACHINING COSTS

The 47% saving was made on a new Gisholt No. 4 Universal Turret Lathe equipped with the Gisholt speed selector. This is a great time saver because while one cut is in progress, the operator can select and pre-set the spindle speed for the next cut. The pre-set speed is then obtained by touching a trip and the machine automatically makes the shift. There is no loss of time.

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"Speed Selector"

The most efficient control ever devised for the purpose. Operator sets dial to diameter of the cut and the machine automatically responds with the most efficient cutting speed, whether it's for turning, facing and boring. A touch of the high-low trip immediately provides proper reaming or threading speed. Available on Gisholt Nos. 3, 4, and 5 Ram Type Universal Turret Lathe. Literature will be sent on request.



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TOOL ENGINEERS MUST QUALIFY

(Continued from page 12)

try. I, personally, am going to regard the Tool Engineer as one of the sources of personnel to assist in taking over the reins of industrial management and wish to appeal to the Engineers as a whole to make it their responsibility to learn, observe, and absorb the requirements of manufacturing that will make them eligible for that responsibility.

They must, however, always keep in mind that they will have to be promoted to a minor executive position not usually of lesser compensation, and gain industrial management experience before they are eligible and capable for a major position. Does Management

purchase ability and experience? You can purchase experience and ability but must be able to lead the individual in applying his experience and ability in such a manner as to properly function in the plant he works. It has been said that education without the will to work is intellectual mockery, and we must eliminate the mockery.

Do You Like Your Job?

Perhaps you may be a good Tool Engineer with the right background, but do not find the work a pleasure. I, myself, tried to learn to be a good machine and tool designer; found the work most interesting and had the ideas in the mind for designing, but was never able to neatly put my ideas on paper. I was

never able to print or make a neat drawing and my supervisor used to tell me that as far as producing a good looking design, I would do better as a sweeper. I had put hours of hard work and practice, in trying to learn to print and do detail work. After two years, finding that I never would be able to do the work neatly, I became most unhappy with the position and resolved to do something that could be accomplished well and asked to be transferred to Tool Engineering. If such is your case, decide what type work you are interested in and if your background is such that you would be capable of that work, get busy and learn all about it. Learning about it is a matter of research. It has been said that research knows no limits except man's imagination and his ability to think.

Although little recognized, is the amount of knowledge one obtains from arguments. Ordinarily we look upon arguments as undesirable and in many cases they do not produce results, but if carried on in the right spirit I am satisfied that they are resultful in gaining knowledge.

Industrial management consists of coordinating men and machines. Men are picked with the same scrutiny that the Tool Engineer selects a machine. Is he capable, is he adaptable, and will he perform the job as the Management requires? Is his personality, intelligence, and make-up such that he will promote cooperation with other supervisors? This last requirement is the one that requires the most study and analysis. This function of Management is no different than that which the Tool Engineer does. He sets up the operation sheet and selects his machine and must give due consideration to equipment the same as Management must do to men, with the exception of the intelligence and personality phase.

I would like to cite an instance which occurred in our Chrysler Plant which will illustrate some of the moves that Management must take to make everything function. Sometime ago our sheet metal in-the-white was under one superintendent and the painting of the sheet metal was under another. Occasionally there would be criticism on the quality of the appearance of our car on the sheet metal. I would call the paint superintendent to find out why and he would tell me that it was on account of poor metal finish. I would then call the superintendent in charge of metal finish and he would tell me that it was a poor paint job. After this had occurred numerous times I deemed it advisable to change my operation sheet so that the paint superintendent also took charge of the metal in-the-white. This was sometime ago and today we have had no arguments regarding the appearance of our car. In other words, the responsibility was fixed to where one man was directly responsible for the total operation of metal finishing and painting and could never offer the alibi that someone else was responsible.

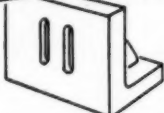
Here's another example of how our
(Continued on page 36)

Why TOOLROOM FOREMEN AND CHIEF INSPECTORS CHOOSE TAFT-PEIRCE TOOLROOM SPECIALTIES

28 SPECIAL TOOLS
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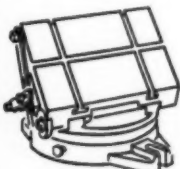
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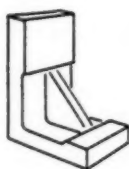
Slotted Angle Irons



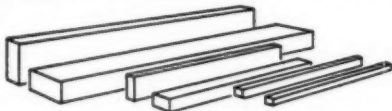
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Adjustable Angle Plate



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Foremen find that these standardized specialties save time ... and widen the range of machine application (a point of prime importance to tool shops and small manufacturers).

Inspectors in precision plants know that these tools are vital safeguards to accuracy. They also know the value of being able to secure such equipment immediately from stock.

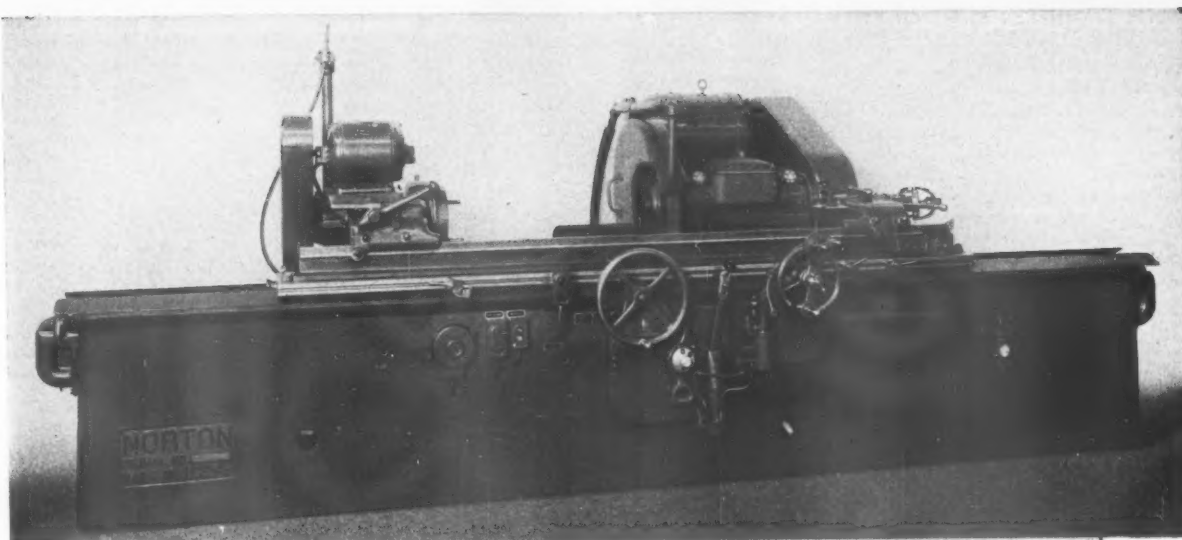
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Although we did not have much of a variety of material ahead for this machine, he did some very excellent work on enough pieces to demonstrate the accuracy, speed and finish we can expect from future production work.

Our present operator is one of our selected apprentices who is fast developing into a careful and speedy man on cylindrical grinding. We have questioned him about several things unknown to most operators and we again find that your demonstrator was very thorough in starting him off.

We certainly hope you will continue to watch our progress with this excellent machine and feel free to express our enthusiasm for it among your prospective customers.

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NORTON GRINDERS

TOOL ENGINEERS MUST QUALIFY

(Continued from page 34)

Management brought about, through analysis, the controlling departments function; such as burden control, time study, costs, and final car inspection. The Works Manager has control of all production and is also in charge of costs, but plays no part in setting these costs. The man in charge of these standards reports to the President, and the Works Manager has no jurisdiction over these supervisors, nor final car inspection. In other words, study and analysis by Management has shown that the Works Manager should produce at a volume and at a direct and indirect labor cost set by people over which he has no jurisdiction. This removes any possible chance of him making his job

easy. The men at the head of these controlling and standards departments are capable and reasonable and are most certain not to set up a standard that cannot be complied with under ordinary operating conditions. The Works Manager also finds it necessary to produce a car of such quality as the final car inspector designates. This final inspection is a representative of the Sales Department, and manufacturing is in no position to argue quality in order to make their operations appear satisfactory. This organization set-up amounts to the checker checking the checker and from my experience I would not want to work any other way. No other organization other than this type could be as effective in reducing costs and maintaining quality. Here, again, I cite

this merely to illustrate what the Tool Engineer must possess in analytical power to eventually work into the Management end.

Analysis

Analysis is a matter of mind, the most necessary possession of man. You can sacrifice all other possessions, but to progress you must have an analytical mind. All people with whom we come in contact examine our mind. They do this for various motives and we trust they do not find it lacking. The mind is the power that conceives, judges, reflects, imagines, and remembers, and our thinking should not be neglected. Develop it daily in methods that are creative and you should become capable of greater responsibilities.

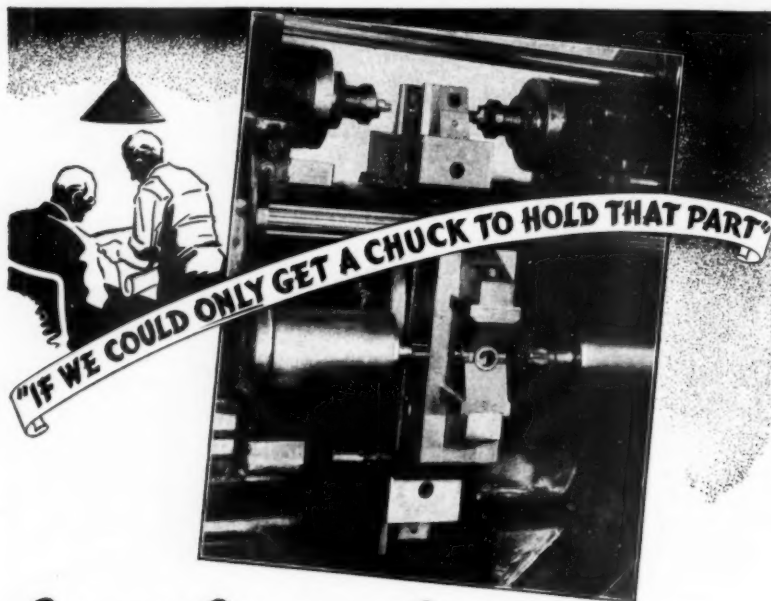
Management is the unseen force which directs that which is physical within a factory and is by far the most important factor of the present industrial age. Machines may be put to work, workers may labor, Sales Departments may sell, but without adequate Management to organize and consolidate them into a profitable organization to distribute the results of their work effectively to govern their operations during performance, this performance may become so uneconomic as to cease entirely. We see the physical side of industry but are likely not to think of the directing force, but see only the results. The test of the present industrial system is its ability to adjust itself to modern conditions.

Management, and by Management I mean all persons directly responsible for some phase of manufacturing and selling, is a broad term and covers all the factors in the operations of an enterprise. Management unites all the elements in the control of business activities and correlates all the details of operation so the organization will work as a whole toward the desired goal. That goal is profit for everyone and you must be responsible in your operation for creating and maintaining policies that will contribute toward it to gain the proper recommendation of your ability in the factory where you work. Industry needs young engineers and others to fit themselves to carry on. Management requires the utilization of different types of genius. These requirements you and I must develop. Management requires men that create ability to establish policies and the ability to execute methods and plans that are devised for them.

A Tool Engineer must understand milling, drilling, broaching, forging, machinery, etc. The executive, from the foreman on up, must know the basic fundamentals of organization, planning, production, costs, and general control.

My recommendation to Tool Engineers would be, obtain the knowledge Management requires for executives and prove to your employer by your operation that you have obtained it.

What is your answer to the question—"Is Abrasive sand blasting a cleaning or machining operation?" Write us your answer to this. See next issue for details.



Special Chucking Problems

Find quick solution in the CUSHMAN ENGINEERING DEPARTMENT

Many leading plants throughout the country regularly call upon The Cushman Engineering Department for help in the solution of special production problems, where extreme accuracy of machining is essential, but where competition demands highly efficient production.

In the above illustration, for example, special steel body 2-jaw chucks were developed for a production machine in a large manufacturing plant. Here four chucks are mounted on an indexing carrier to bring the work pieces to each station—the chucking and releasing are accomplished by built-in power equipment and each chuck is dust proof to provide long service life.

The extreme accuracy of the chucks themselves plus automatic power operation, cut production time on this job to a minimum while producing work of high and consistent quality.

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Since 1862**



SMALL CHARACTERISTICS OF YOUR SMALL TOOLS loom large in your production costs. The name "Morse" on your tools signifies that, in the manufacture, no small detail that makes for profitable service has been lost sight of.

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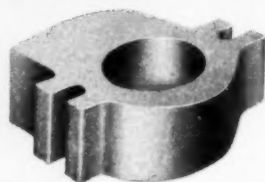
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Contour Sawing is a new process of machining. Recognized as the fastest precision method of removing metal; cuts out internal and external shapes from any metal up to 10" thick.



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DoAlls are used in quantities in large and small plants in 23 countries, and by such well-known firms as Ford, Fisher Body, Cadillac, Baldwin Locomotive, Douglas Aircraft, U. S. Navy, International Harvester, General Electric, Westinghouse, Ace Tool & Die, Glenn L. Martin, etc.

Let a factory-trained man bring a DoAll to your plant and show you what it does, what it saves on your own work.

- ☐ Send data on the DoAll
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Name

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Chapter Meetings for May

BUFFALO

May 1, 1939—Dinner 7:00 P.M. University Club. Technical Session 8:00 P.M.

Speaker: A. M. Swiger, Chrysler Corp.
Subject: "Superfinish."

CHICAGO

May 1, 1939—5:30 Opening of exhibits. Dinner 6:30 P.M. \$1.00, at Midwest Athletic Club, 6 North Hamlin Avenue. Admission: By membership card, Guests 25c. 8:00 Showing of Industrial Moving pictures by Western Electric Co. "Looking into Metals" and "The Voice of the City."

Speaker: Mr. A. B. Segur.
Subject: "Motion Time Analysis."

Reservations—Make reservations for dinner.

DAYTON

May 15—6:30 P.M. Gibbons Hotel. First Anniversary Meeting.

Speaker: Maj. J. F. Powell, Procurement Planning Head of the Air Corp., Wright Field.

Subject: "Relation of Tool Engineer to the Government in Case of a National Emergency."

Reservation: Call Walter Olt or by card.

PHILADELPHIA

May 11, 1939—Dinner 6:30, Engineers Club.

Speaker: Dave A. Wallace, Chrysler Company.
Subject: "Superfinish"—Universal and Ultimate.

Reservations—Paul W. Frankfurter, 4623 Morris Street.
(Continued on page 40)

WITTEK AUTOMATIC ROLL FEEDS



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make of
Punch Press

**FAST — ACCURATE
SAFE — AUTOMATIC**

WITTEK Roll Feeds are quickly installed on any press without alterations—feed any stock from coils in lengths up to 24" per press stroke.

WITTEK Reel Stands, 6 models, make one man job of centering heavy coils. Write today for Bulletin TE giving complete details.

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Fast
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for various tol-
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Improves
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Swivel and stationary types with semi-steel bodies and jaws fitted with renewable steel plates; large steel screws with accurately cut acme threads, supported in bearings at either end; hardened and ground steel washers in jaws to absorb thrust. These are heavy duty, quality vises—5 types each in 2 or more sizes.

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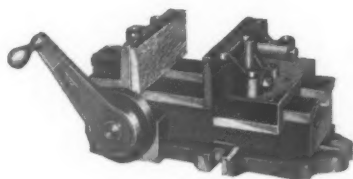
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Positive clamping, no amount of tool pressure or vibration will loosen work.

Wide movement of Jaws, 2" in 180° handle travel.

Jaws bored for form jaws.

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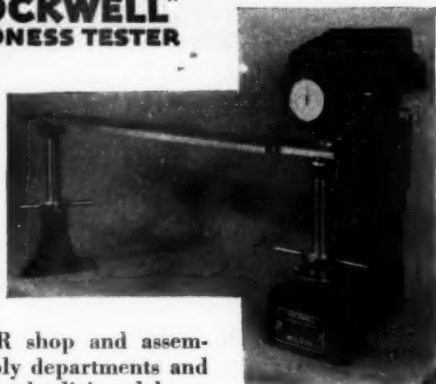
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They are all alike and any one of them is ready to do its work, whatever and wherever that may be.



WILSON

MECHANICAL INSTRUMENT CO. INC.

380 Concord Ave. New York
Only Wilson makes "ROCKWELL"
Testers

Chapter Meetings for May

(Continued from page 38)

ROCKFORD

May 11, 1939—Dinner, entertainment, etc. 6:20 P. M. Assessment \$1.00. Faust Hotel, entire eleventh floor. 5:00 to 12:00 P.M. Continuous Display of Educational Exhibits.

Speaker: Ralph A. Powers, Vice President, Electronic Control Corp.
Subject: Photoelectric and Various Electronic Control Devices Used in Industry.

Speaker: Furnished by the Chrysler Corporation.

Subject: Superfinish.

Reservations: Make by May 9th to Allis-Chalmers Office—Talcott Bldg., Main 6270.

ROCHESTER

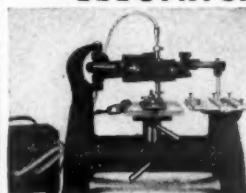
May 2, 1939.

Speaker: R. H. Rogers, General Electric Co.

Subject: "Application of Electric Eye to Machine Tools, etc."

(Continued on page 44)

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FURNISHED with interchangeable self-contained motor-driven rotary cutter head... for engraving on machinable surfaces

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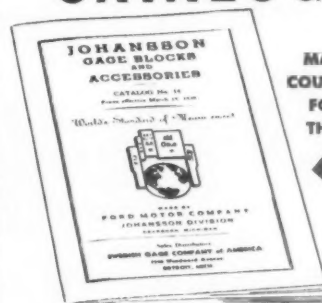
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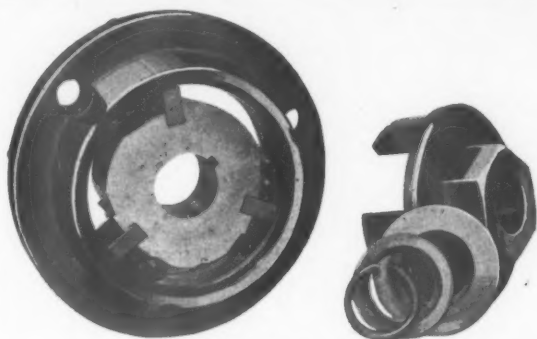
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Standard Fixture Lock Assembled for
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Counter Clockwise

THE COMBINATION DRIVE FIXTURE LOCK AS BUILT ONLY BY SWARTZ

THE KEYS WHICH DRIVE THE
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4 STATION
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The machine shown above is entirely automatic, the operator's duties consisting only of loading and unloading. Control and timing of the mechanism is entirely electric, being accomplished by limit switches and relays with an electric safety device to prevent indexing if the fixtures are not clear of interference.

Bradford designed and built this machine for performing several operations on an oil distributor body for an automobile engine.

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are precision ground from the solid after the one-piece blanks are fully hardened. They can be re-ground many times and will save you considerable money over any other rotary files made.

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The Chas. L. Jarvis Co.
MIDDLETOWN • CONN.



"TOWARD ABUNDANCE"

(Continued from page 13)

the tools, machinery and methods that reduce the human effort needed to make goods, we thereby reduce the relative price so that each man may have more in exchange for his own effort. A condition that is seldom appreciated is that a reduction of relative price by one half would be of no benefit to the rich man, who now has all the goods he can use, while it doubles the real income of the poor man. The constant improvement in tools and machinery to reduce human effort, in the absence of unemployment caused by money hoarding, is of greatest benefit to the poorest

man. Suppose the price of an automobile should be \$100.00, and of a fine home \$1,000.00, every man would have them and many men would be required to build them. It must be remembered, however, that this is only true when the reduced price is a reflection of an equal reduction in human effort. Any other cause, such as government price fixing, is merely arbitrary redistribution of wealth, whereby, one man is deprived to aid another. There is no total gain, except through reduced effort.

Our five men have each been working ten hours per day. They agree to reduce this to five hours, thus making half as much product. In the market they can exchange as before, but get

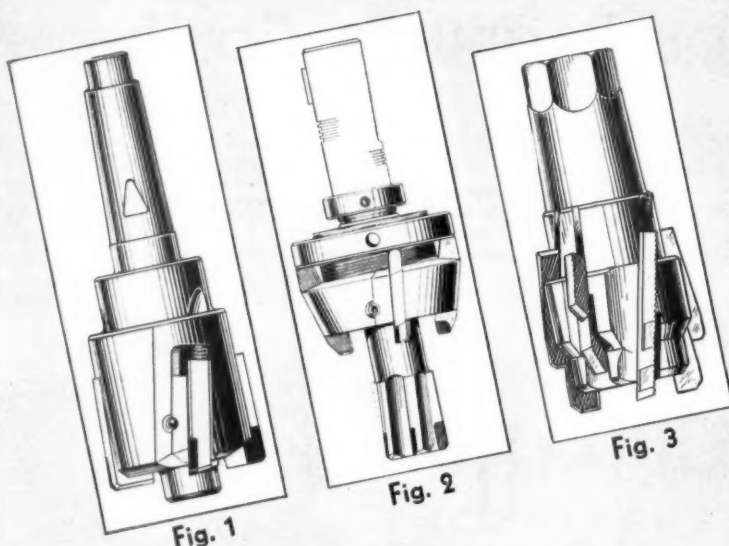
just one half of the former amount of goods. This is entirely satisfactory, if they so wish it, but we must remember that short hours, whether voluntary or by force, have only one result, which is a reduction in the goods that each of us may have in exchange. It reduces abundance or the standard of living, and, most important, such reduction puts its greatest penalty on the poor man, this being the reverse of the effect of increased abundance which gives its greatest benefit to the poor.

The decrease in the standard of living that results from a vast group of non-producers, supported by the worker, through the government, is a matter of great moment which again is most severely felt by the poor man. Many men are unemployed because of the hoarding of money.

Government has elected, through direct and indirect taxes, to take away the substance of those who remain at work and give it to those not employed, while continuing to create unemployment because of policies that induce further hoarding. Government might well act to cause the release of hoarded money, thus creating jobs for all, and increased abundance for all, thereby allowing the worker to reap the full reward of his efforts instead of being forced to share it with another. It matters not that some men may profit by this, so long as these profits are used to buy goods, creating work, or else through the medium of investments in business, farms and houses, all of which creates jobs and increases abundance. Probably the ability to realize and keep a profit is the only force that will put this idle money to work, but what matter, provided it is not hoarded, but used to create more work.

To sum up this brief discussion, we see that the Tool Engineer, who is an important force, constantly helping to reduce the human effort needed to make goods, is doing no social harm, but, on the contrary, is a great force in the direction of increased abundance for all, and mostly for the poor people. He is helping to increase the standard of living. He may not change the distribution of money between the poor and the rich, but he is changing the distribution of goods so that the poor man will gradually come closer to the actual standard of living of the rich man, unless of course this constructive work is offset by general policies that reduce the standard of living faster than he helps to increase it. He has no effect on unemployment, which is due to the hoarding of money. Perhaps this may help you to gain a new perspective on your life, your work and your usefulness to society.

Special Gairing Tools



Hollow Mills
Boring Tools
Cutter Heads
Cemented Carbide Tools
Multi-Diameter Cutters
Floating Holders
Actuating Tools
Anti-friction Holders
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High Speed Cutters to specification
Gair-Lock Milling Cutters

Designing and building the tools required for complicated end-cutting operations is our particular job. The examples illustrated here are typical of hundreds of "specials" produced under the critical eyes of Gairing engineers.

Fig. 1 - Boring tool with two-way adjustable non-serrated blades, cemented carbide tipped. Fig. 2 - Hollow Mill and Facer with adjustable length core drill, cemented carbide tipped. Fig. 3 - Gair-Lock Multi-Diameter cutter with inserted sub-land blades.

May we assist you?

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Keep your Standard Data Sheets in perfect order at all times—ready for instant use and reference when you want them. Binder, made especially to fit these sheets, with your name on front cover, \$1.25. Write A.S.T.E. Detroit for full details.

ASK THE MEN WHO USE THEM



... we are using Gorton machines, and everyone is busy every day. We started using them several years ago and have added new units several times since."

This same story is told wherever there are tool rooms and die and mold shops... in the plastics field especially, and in the rubber, glass, and forging industries. Gorton Super-speed Milling Machines, Duplicators, and Pantographs do the job better, in less time, and at lower costs. Operating savings of as much as 70% have been reported, and Gorton machines usually pay for themselves the first year.

Send for Gorton catalog or describe your production problems to us; we may be able to effect substantial savings for you. Write today.

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MEET TODAY'S COMPETITION WITH TODAY'S TOOLS!

PART COMPANY WITH OBSOLESCENCE

ANY man who goes forth to fight competition these days with Obsolescence as an ally soon finds himself attacked from front and rear at the same time! If this is your experience, call a halt on such a forsaken encounter by starting a program of equipment modernization in your plant.

And let us suggest as a good beginning a thorough check-up of your metal-cutting tools, followed by a visit from our representative, who will show you where economies may be effected by changing from old-type, solid lathe, planer and shaper tools to OK Single-Point, Inserted-Bit Tools, such as those shown here. This visit will not obligate you in the slightest, and should mark the turning point in your battle for better profits.

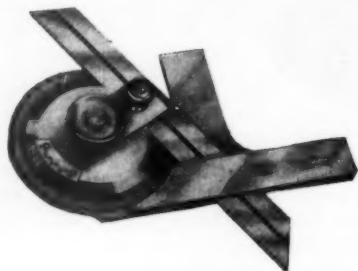


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INSERTED-BLADE METAL CUTTING
TOOL SYSTEM

The Mauser Bevel Protractor For Laying Out and Measuring Angles



Here is a precision tool that permits one to lay-out or determine any angle to an accuracy of 5 minutes, or $\frac{1}{2}$ of a degree.

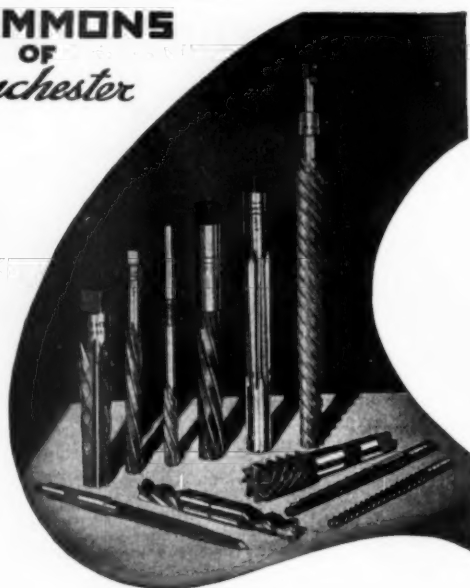
The back of the tool is finished flat so that it may be flush when placed upon work or paper.

Complete with 6" blade the Mauser Bevel Protractor costs only \$12.50. 8 and 12" blades available @ \$1.50 and \$2.50.

WE WILL SEND THIS TOOL ANYWHERE IN U.S.A. ON 10 DAYS MONEY BACK TRIAL. Order your tool today.

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ORIGINATORS AND
MANUFACTURERS OF HELICAL
FLUTED TAPER PIN REAMERS

THE GAMMONS-HOLMAN CO., MANCHESTER, CONNECTICUT

(Continued from page 40)

SCHENECTADY

May 4, 1939—6 P.M. Dinner meeting, Roosevelt Hotel, 149 Washington Ave., Schenectady, N.Y. Followed by technical session at 8 P.M. in Rice Hall of the General Electric Co., Schenectady.

Speaker: Mr. R. H. Rogers of the General Electric Co.

Subject: "For Faster and Safer Machines."

Reservations—Write the secretary, Mr. G. F. Murphy.

ST. LOUIS

May 4, 1939—6:30 P.M. York Hotel.

Speaker: Mr. R. G. Roshong, Metallurgist, Lindberg Engineering Co.

Subject: "Heat Treating Problems."

Reservation—Call York Hotel, CHestnut 9700.

TRI-CITY

(Moline—Rock Island—Davenport)

May 10, 1939—Dinner 6:30 P.M., Fort Armstrong Hotel in Rock Island. Technical Session at 7:30.

Speaker: Mr. W. G. Robbins of Carbonyl Company, Inc.

Subject: "Tungsten Carbide."

PITTSBURGH

May 12, 1939—Dinner, Metropolitan Club in Keystone Hotel. J. R. Weaver Testimonial Dinner.

SYRACUSE

May 3, 1939—Dinner, Industrial Club Auditorium.

Speaker: R. H. Rogers, General Electric Co.

Subject: "The Application of the Electric Eye to Machine Tools."

ST. PAUL-MINNEAPOLIS

May 10, 1939—Dinner 6:30 P.M., Minnesota Union.

Speaker: A nationally known authority.

Subject: "Superfinish."

Reservations: Phone Regent 0462 not later than May 9.

YORK

Central Pennsylvania Chapter No. 22

May 9, 1939 at West York Inn.

W. Market St. & Highland Ave., York, Pa.

Dinner—6:30 P.M. 75c. Meeting & Technical Session—7:30 P.M.

Speaker from the Federal Machine & Welder Co., Warren, Ohio.

Subject: "Resistance Welding."

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RELY ON UNIVERSAL DRILL-BUSHINGS



The Super finishing of the bore and the combined nitrogen and carbon case of Universal Drill Bushings insures exceptional accuracy and wearing qualities.

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For inside and outside band sawing, filing, and polishing on dies, shoes, templets, and endless other jobs. A decided labor saver. A sturdy machine of ample capacity.

Send for literature.

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Grand Rapids, Mich.



HYDRAULICS

(Continued from page 11)

in their cylinders, but generally the pistons of such cylinders where oil service is used consists of a close fitting piston in a carefully honed steel tube, and the piston being of gray iron, is fitted, generally with automotive type piston rings. In the stuffing box are self-adjusted packings, which, when once adjusted require no further attention, from the machinery operator. These packings in the stuffing box, being self-adjusted are subject to pressure only when that side of the cylinder is under pressure, to which the stuffing box is applied. Very long length of service is secured from this self-adjusted type of piston rod packing. The cylinders can be secured with or without cushioning features to absorb the shock of the moving piston and its load at each end of the cylinder. These cushion features should be secured adjustable, so that they may be regulated to the load requirements of the installation. These enable the machine manufacturer to adjust the shock absorbing feature of the cylinder to meet exactly the requirements of the machine, which is a very hard thing to determine previously to the cylinder installation.

The means of connecting the units of a hydraulic installation is most important, that leaks and interruptions of operation can be avoided. Several methods and materials are available on the

market today. Heavy steel forged fittings used with extra heavy steel pipe are used for the high pressure installations. Extra care must be used in threading the pipe that it properly conforms to correct fit of the valves and fittings. Use only new clean pipe and it is good practice to acid clean all pipe and fittings to remove all pipe scale and dirt. Copper and Molybdenum steel tubing with compression fittings are very satisfactory for the low and medium pressures. Avoid all sharp turns and pickets in piping installations, and use as few a number of fittings as possible. Considerable inefficiency in the hydraulic circuit can be caused by improper piping.

Hydraulics, in its industrial applications, is performing operations otherwise impossible, without its use and effecting great reduction in costs. It is being regarded as one of the most important elements in industry and users advocate its continued use and expansion.

March 16th election meeting of the DETROIT STUDENT CHAPTER A.S.T.E. was a great success. Earl Barringer, Chairman, William Legg, Vice Chairman, Arthur Dlouhy, Secretary, Michael Melnik, Treasurer are the new student officers. A plant tour is being planned for their May meeting, Thursday the 25th.

HANDY ANDY SAYS

(Continued from page 30)

pressed on your consciousness, the founder of the American Society of Tool Engineers. Modest and unassuming, O. B. has hidden his light under a bushel, retiring the while he put his fellows into the limelight and, often enough, into fine jobs. The Society has conferred similar honors on other educators, and it is entirely fitting that these men should have been honored; a belated award to O. B., first in his field, is proof that a prophet is not always forgotten in his own home town. Here's to you, O. B.—honor and a Skoal! Gentlemen, break your glasses.

Yours for progress,
Handy Andy.

BOGEY MAN OF THE MACHINE SHOP

(Continued from page 9)

plication of the "Modified Mnemonic Symbol System," as used for tool bits of various description. You will note the simplicity of the drawing and the ready information available, such as, material, ground or unground stock, and stock size. Also, at a glance, such information as to the number of parts this tool is used on, the operation number and number required.

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- Quick
- Accurate Adjustment



Furnished with
an Acme or Standard
V Thread ground on the
outside diameter, furnishing a
bearing on the front end of the adapter.

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SAVES SET-UP & MACHINE-DOWN TIME!

Change diameter—lock blades quickly, in one operation, without removing from machine! An ideal tool for progressive hole enlarging . . . stub boring . . . boring to a shoulder or "bottoming"!

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IT DRILLS AND COUNTERBORES IN ONE OPERATION

Combines 2 or more tools—2 or more operations into one! ECLIPSE Welsh Plug® Cutters machine accurate, leak-proof holes for inserting Welsh core hole plugs—and do it faster. . . They're ECLIPSE designed for grind after grind—longer life—lower cost!

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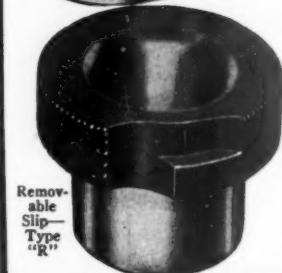
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Fit—
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Send for bulletin containing complete data and low prices. Satisfactory service guaranteed.

Also manufacturers of complete machine parts, specializing in hardened and ground parts requiring extremely close limits, lapped fits, etc; also hydraulic appliances for pressures up to 20,000 lbs. per square inch.

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ARMSTRONG



Have you the right
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for machining
today's tougher
steels?

The newer, tougher alloy steels need offer no unusual machining problems, for there are ARMSTRONG TOOL HOLDERS especially designed to handle them. The ARMSTRONG Spring Cutting-off Tools have a "goose-neck" form and resiliency that prevents work from climbing up on the cutter, prevents excess tool breakage, and makes cutting-off an ordinary instead of an extraordinarily expensive operation. Other ARMSTRONG TOOL HOLDERS, that every shop working in tough alloy steel should have, are the Spring Threading Tool and the new ARMSTRONG Carbide TOOL HOLDERS. Equipped with Armide (Carbide Tipped) Cutters, these "carbide" Tool Holders will machine hard steels without annealing, will go as much as 50 times as long without re-grinding.

It is a sound policy whenever faced with a difficult cutting problem to first look in the ARMSTRONG catalog for there you will find efficient cost-cutting tools for every operation on lathes, planers, slotters, and shapers.



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YOU CAN'T AFFORD
TO OVERLOOK A
700% Weekly Profit
WHEN MACHINING
STEEL



Here is a typical saving made possible by the use of KENNA-METAL-tipped tools in the machining of Nickel-Chromium gear blanks:

Savings per Tool

50% less "floor to floor" time, or 4 hours per day
Cost of labor plus overhead = \$2.00 per hour
Savings per day = 4 (hours) \times \$2.00 = \$8.00
Savings per week = $5\frac{1}{2}$ (days) \times \$8.00 = \$44.00
Cost of No. 11 tool (in lots of 5 to 9) = \$6.34
Profit per tool per week = approximately 700%

Since KENNA-METAL will machine steel up to 500 Brinell, you may expect additional profits through savings in annealing charges, and the accurate finish it provides will save you many dollars in grinding costs. Investigate KENNA-METAL today, and learn how it will cut machining costs in your shop.

Catalog No. 2 explains how to torch braze your own tools using KENNA-METAL blanks. Write for your copy without delay.

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TELLS A LOT!**

From your very first look at The Haskins Tapper you can tell it was built to do an altogether different kind of tapping job—and to keep on doing it! And the more complete your examination, the more you understand why this machine is setting new standards of speed, precision and endurance in hundreds of plants. There's no cost or obligation involved in taking a good look at The Haskins Tapper in the light of **your own** production problems—any time you're ready!



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Tapping
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SAFETY Line!



DYKON Gage

shows when Diamond has worn to **lowest** safety level and should be returned for resetting.

Continued further use means abuse

Let the DYKON Gage lengthen the life of your diamonds

This simple, positive protective device is adapted for all Diamond Tools and is an exclusive service offered without charge to all users of our Diamond Tools.

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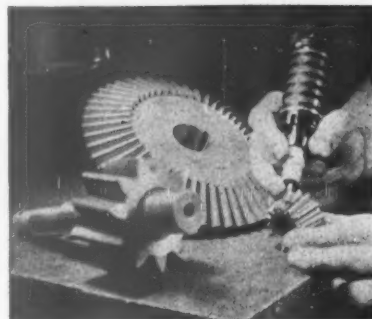
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TWO NEW SIZES AND TWO NEW IMPROVEMENTS



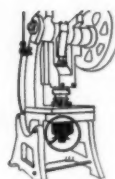
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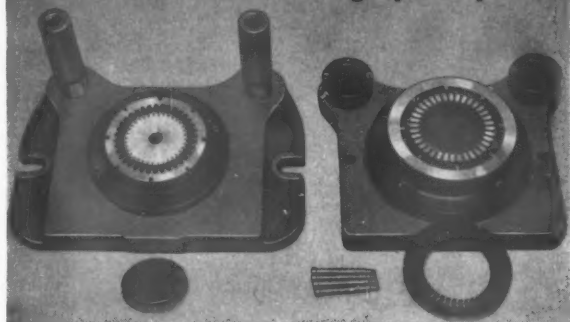


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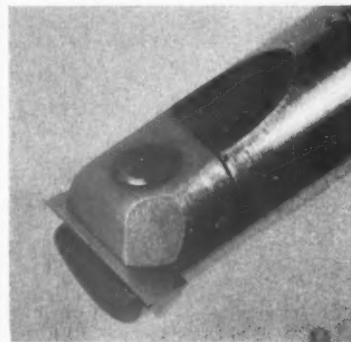
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The new Everede Boring Bar is the only bar on the market having the economical triangular bit. The design of this boring bar permits the use of a larger diameter than formerly used, due to having the bit cut in front, making room for the bar. This design spells rigidity, making higher boring speeds and heavier cuts possible.

The Everede Boring bars are made of the finest heat treated nickel steel; and each bar comes equipped with six high speed steel triangular bits. In addition, this is the only boring bar that allows the use of a solid Stellite or carbide tool bit. This is accomplished by clamping the bit on the "V" type grip, which holds it firmly without danger of breakage.

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OF INTEREST TO THE TOOL ENGINEER

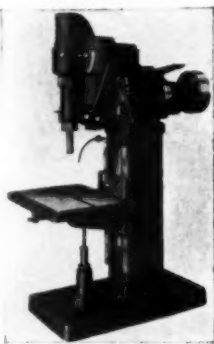
Geo. Scherr New Tachometer

George Scherr Company, Inc., 128 Lafayette St., New York City, has recently brought out a new Universal hand tachometer especially designed for plants that need to measure speeds over a wide range. This model known as the "S & S" Jewelled Hand Tachometer is unique inasmuch as it contains eight jewels, an improvement that adds to the life of the bearings, reduces repair costs and guarantees accuracy at high speeds.

The new instrument is manufactured in two models, one measuring from 30 to 40,000 R.P.M. and the other from 25 to 30,000 R.P.M. It may be used for motors, engines, shafts and spindles, looms and turbines, for textile, paper and power plants. It may be applied wherever it is necessary to check and measure speeds.

New Hi-Duty Tapper

Leonard J. Kaufman, president L. J. Kaufman Mfg. Co., Manitowoc, Wis., announces the purchase of the Gaterman line of tapping machines from the W. Gaterman Mfg. Co., also of Manitowoc. In the future these tapping machines will be manufactured in the Kaufman Mfg. Co. plant. Several new features have been incorporated in the new Hi-duty Tapper, illustrated here, and whose principle is covered by basic patents. This machine operates on the same principle as hand tapping, only far more sensitive, as the working strain is weighed to a fraction of an ounce, the manufacturer points out.



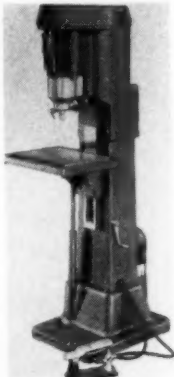
Gisholt High Production Turret Lathes

New Haskins Vertical Air Controlled Tapping Machine

A new type of tapping machine—one in which the operation is entirely air controlled for the purpose of securing the utmost in sensitivity and accuracy as well as speed of operation, is announced by The R. G. Haskins Co., 2756 West Flournoy St., Chicago, Ill.

In this newly developed high speed, precision tapper the motor is stationary, driving the tap head through a "V" belt and multi-speed pulleys.

Compressed air controlled by an automatic air valve furnishes the pressure required for both the tapping and reversing strokes of the tap head. The automatic valve also controls the speed with which the tap is fed into and reversed out of the part.



A foot pedal unit enables the operator to start or stop the tapping cycles, which are under control of the automatic valve. The machine will operate in continuous cycles as long as the air valve is held open. It can also be used intermittently by operating the foot pedal and then releasing it to produce one complete cycle.

This machine lends itself to feeding parts into a simple holding fixture or a magazine fixture. It is also adapted to hopper feed, dial feed, or other specially designed fixtures.

New Ammco 6" Portable Precision Shaper

A new improved type portable Ammco 6" Precision Shaper is the latest development of the Automotive Maintenance Machinery Co., 2100 Commonwealth, North Chicago, Ill. It meets the great demand for a practical, low priced, small precision machine. It is used for surfacing and finishing flat work and almost any kind of small irregular shaped parts, and for slotting and grooving operations. It is also used

ful for machining out blanking dies, either the inside or outside, to a scribed line. Ample speed for rush jobs, accuracy for close work, and capacity for a wide range of work with economy and satisfaction, are claimed by the manufacturers.

The Shaper and counter Shaft of this portable model are mounted on a standard maple cabinet. Large casters and handle on bench provide portability



so that the Shaper can be rolled to the mechanic's work bench—thus saving time and steps.

The Shaper itself, which is often referred to as "the machine of a thousand uses," incorporates several new features.

Feed Mechanism is simple to adjust as there is no adjustment of any kind between the ratchet and the eccentric when the table is lowered or raised. It is only necessary to move a small lever for variation in feeds.

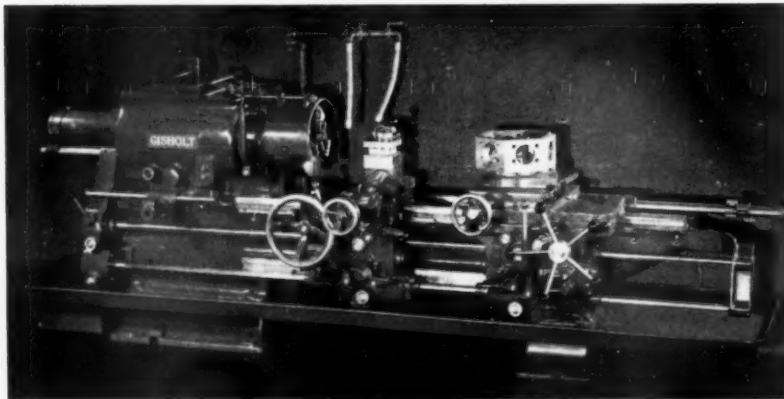
Tool Head is adjustable and graduated from 0 to 90° for angle work, and is quickly loosened or tightened by one screw.

New Improved Gisholt High Production Turret Lathes

Many new refinements to improve the performance and ease of operation, increase machine life and further extend its field of usefulness have been incorporated in the new Gisholt 1L, 2L and 3L High Production Turret Lathes built by Gisholt Machine Company, Madison, Wisconsin. The improved Gisholt High Production Turret Lathes are now available in three sizes, namely the 1L, 2L and 3L. They have bar capacities ranging from 2½" diameter to 4½" diameter and from 36" long to 48" long. The machines have a swing over the ways ranging from 19" to 26" and employ chucks ranging from 12" in diameter to 21" in diameter. The machines are intended for both high production of similar pieces and small lot jobbing of various types of work, and are equally well adapted to both bar work and chucking work.

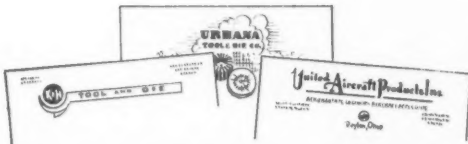
These machines have the new solid hardened steel ways, which provide hardened bearing surfaces on all sides, including the top or main bearings, the sides for alignment and gibbing and the bottom for clamping. The ways are

(Continued on page 52)



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BRYANT MACHINERY & ENGINEERING COMPANY, 400 W. Madison St., Chicago

REPRESENTED BY DEALERS IN PRINCIPAL CITIES

NEW EQUIPMENT

(Continued from page 50)

made of a high carbon alloy steel and are hardened clear through. They are straddle-keyed to the bed through their entire length and are held in place by screws from the under side. The ways are then ground in perfect alignment with the spindle. The solid hardened steel ways will practically eliminate wear, and therefore the permanent alignment and accuracy of the machine is assured.

The strongly braced headstock is cast integral with the bed casting, which provides an exceptionally rigid construction. The headstocks for all three machines have twelve different spindle speeds, the normal range of which for the 1L and 2L machines is from 20 to

486 RPM and for the 3L machine it ranges from 12 to 333 RPM. All speeds are arranged in a geometrical progression, which enables the operator to quickly obtain the most efficient cutting speeds for the varying diameters of work. A direct reading speed plate mounted on the headstock tells the operator at a glance the RPM at which the spindle is running.

The spindle is mounted on precision type tapered roller bearings and all shafts in the headstock, as well as the aprons, are mounted on anti-friction bearings. The gears are made of high carbon chrome molybdenum steel hardened and the tooth contours ground to give perfect rolling bearings and quiet operation. The high speed gears are helical type. A double multiple disc

clutch is used for starting and reversing the spindle and a powerful multiple disc brake automatically stops the spindle when the machine is shifted into neutral. The spindle nose is American standard flanged type A1.

The feeds and rapid traverse are controlled at each carriage independently of each other. Sixteen reversible power feeds in two ranges of eight each are provided for both longitudinal and cross feeds of the cross slide or the cross feeding hexagon turret. The longitudinal feeds range from .004 to .136 and the cross feeds range from .002 to .068" on the 1L machine and .002 to .084" on the 2L and 3L machines. The levers for engaging the feeds on the carriages are provided with direct reading feed plates, which tell the operator at a glance the feed he is using in thousandths of an inch. The feeds are engaged and disengaged by quick releasing type levers of the feed; trips may be set automatically disengaging the feed at the completion of a cut. The cross feed screws on the cross slide and also on the cross feeding hexagon turret are provided with a large diameter dial graduated in one-thousandths of an inch, which permit the operator to feed to close dimensions and assist him in making quick set-ups. These dials are provided with observation clips, which may be set at any point and provide an easy method for duplicating close dimensions.

Multiple vee belt motor drive is standard on all three machines and the motor is mounted on the top of the headstock. The drive pulleys are balanced on Gisholt Balancing Machines, assuring vibrationless operation. Standard motor recommendations for the 1L machine are up to 10 H.P. For the 2L and 3L machines, the motor recommendations are up to 15 H.P. For high speed operation, 15 H.P. motors are recommended for the 1L and 20 H.P. motors for the 2L and 3L machines. The motor is controlled by a conveniently located start and stop switch built into the headstock.

Thorough lubrication adds to the life of any machine and Gisholt High Production Turret Lathes are assured of it by effective automatic lubrication to all important bearings. The headstock is automatically lubricated by a splash system, which carries oil to all gears and bearings. The taper roller spindle bearings are oiled by a continuous flow of filtered oil from a catch reservoir in the headstock. The aprons are automatically lubricated by an oil pump which directs a steady stream of oil over all gears and bearings. The hardened steel bed ways are lubricated under the carriages by a force feed pump, which is engaged each time the rapid traverse is employed. The aprons are closed and all gears, shafts and bearings run in oil baths. The gear train which drives the feed shafts is enclosed and also runs in oil. The complete lubrication system is designed to save operator's time and to insure thorough lubrication at all times.

A NEW DUAL PURPOSE TWO in ONE POWER CHUCK

SLASH INSTALLATION AND PRODUCTION COSTS WITH
THIS NEW 2 and 3
JAW POWER CHUCK



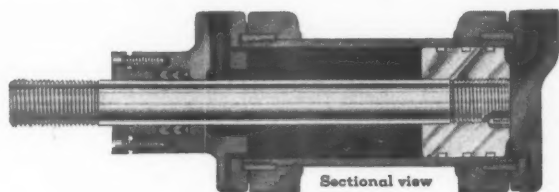
"LOGAN"

TWO CHUCKS for the price of ONE — that's an important saving but not the largest one. This new "TWO in ONE" LOGAN Power Chuck is quickly and easily converted into either a two jaw or three jaw chuck by simply shifting the false jaws. There is no loss of time caused by changing chucks. That's the REAL SAVING!

Made in sizes from 12" up with Universal, Combination or Serrated step-action long jaws. Write now for complete information.

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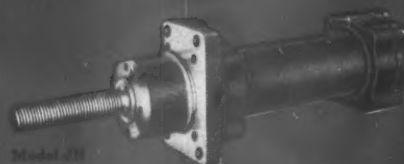
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Model CN



Model CH



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Model CH

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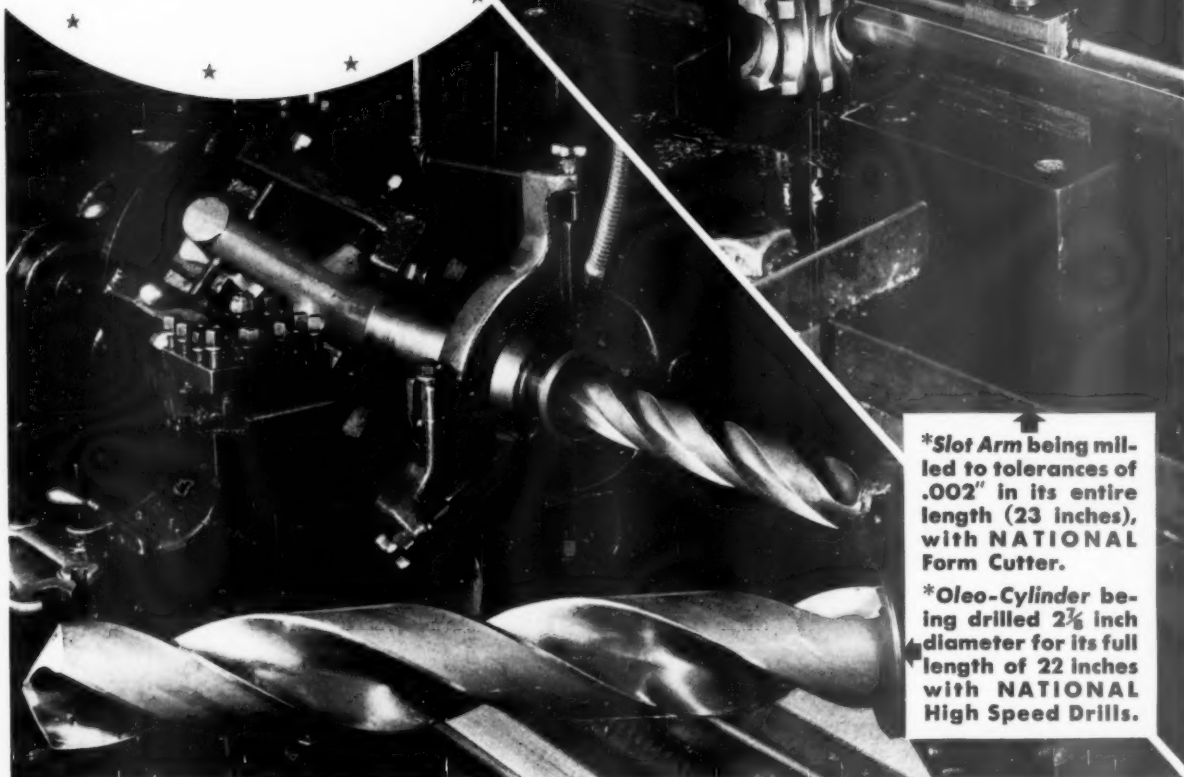
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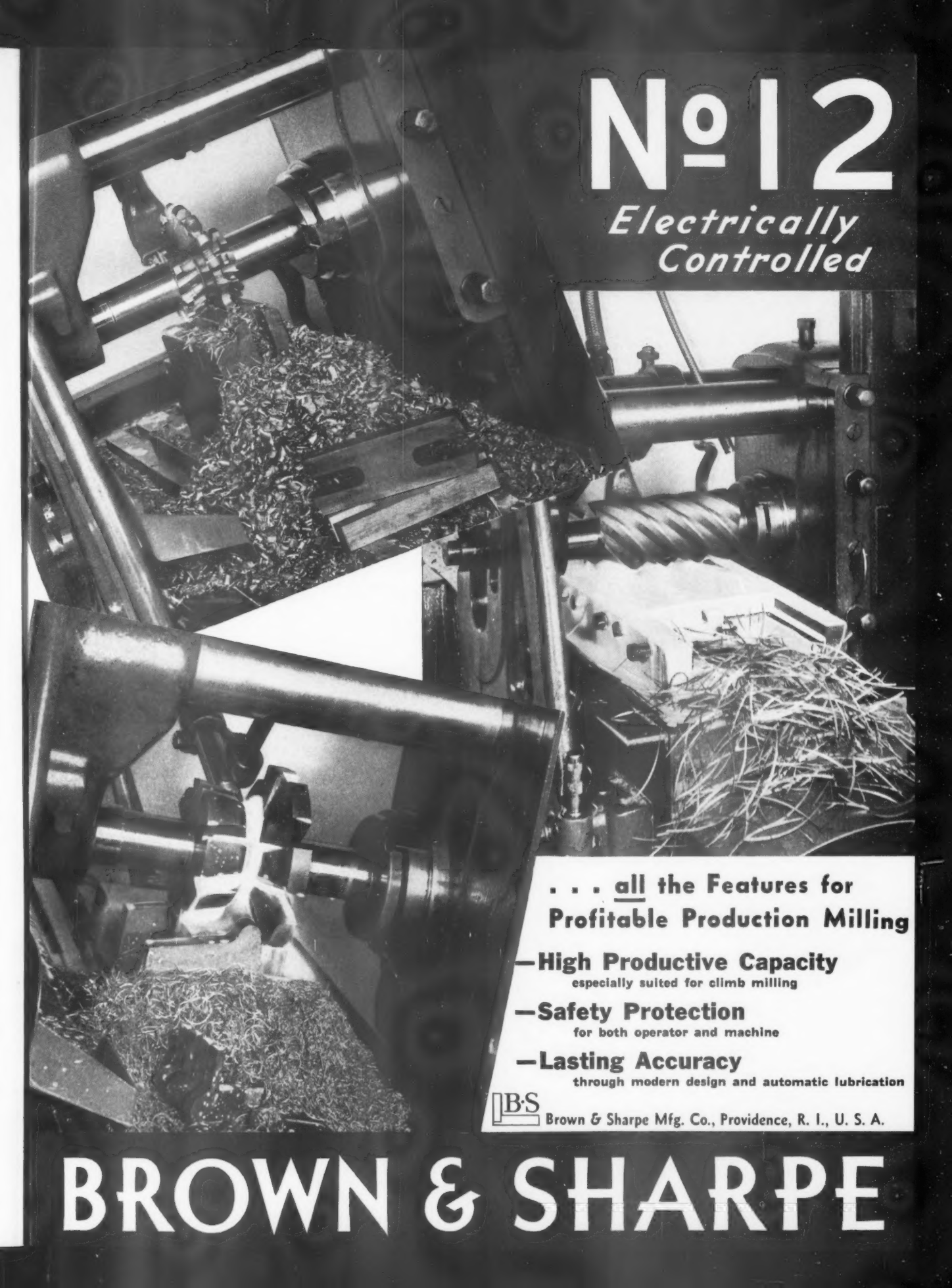
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Nº 12

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THREAD GRINDING OFFERS YOU NEW

SAVINGS

● To obtain the required accuracy and finish on stressed threaded parts, an aircraft engine manufacturer is using seven Ex-Cell-O Precision Thread Grinders as shown at the right. Not only are parts formerly thread milled now thread ground after hardening at comparable cost and output, but service failures have actually been reduced.



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● Production savings ranging up to about 50% on chuck collet hoods with internal threads and 75% on worms with external threads, have been made on miscellaneous lathe parts by a machine tool builder with the Ex-Cell-O Universal Precision Thread Grinder at the right. Grinding after hardening also eliminates errors caused by distortion.



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● All threaded parts are now ground from the solid, after hardening, by a manufacturer of airplane landing gear struts. With the Ex-Cell-O Universal Precision Thread Grinders at the right, machining time has been reduced 50%, rejections are almost eliminated, assembly is faster and a stronger fit is secured between mating parts.



● If you are interested in saving money with Ex-Cell-O Precision Thread Grinders, write today for complete information. Catalog No. 11681

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